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APRIL 2008

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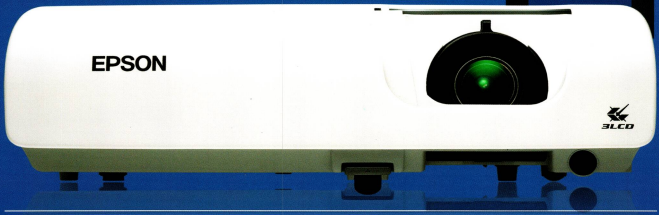
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# contents

HANDS-ON WITH HARDWARE AND SOFTWARE

HARDWARE | SOFTWARE | TECHNOLOGY | GADGETS




## technotes 06


| | | |
|---|---|---|
| Editorial | Editorial | 06 |
| Technotes | All the latest news | 08 |
| Feature | KDE 4.0: A better vista than Vista | 14 |


## opinion 20


| | | |
|---|---|---|
| Opinion | Hasta la Vista | 20 |
| Opinion | Linux Window | 22 |
| Opinion | End User | 24 |



14 BETTER THAN VISTA?
The latest KDE 4.0 release promises to shake up the user interface — not only for Linux, but Windows as well.

48 AMBUSHING THE iPHONE
*Jenneth Orantia* takes a look at the latest swag of smartphones claiming to be the 'iPhone Killer'.

84 COMPUTERS IN SPACE
Modern computing is only now making it into space, where technology has had to deal with unusual problems.




## feedback 26


| | | |
|---|---|---|
| Watchdog | Customer service issues | 26 |
| Epinions | Readers' letters | 28 |


## apc labs 30


| | | |
|---|---|---|
| Labs intro | Ultra-probable | 30 |
| Reviews | MSI HD 3870 X2 OC edition | 31 |
| | Intel Dual-Socket Extreme 'Skulltrail' | 32 |
| | Toshiba Satellite U300 | 36 |
| | MSI MegaBook PR400x | 38 |
| | Wibrain B1H UMPC | 40 |
| | Firebox X Edge X55e | 41 |
| | Nikon D300 | 42 |
| | Mediagate MG45 & MG450HD | 44 |
| | What's new in SQL Server 2008 | 46 |
| Roundup | Ambushing the iPhone | 48 |
| Roundup | Small business & workgroup servers | 56 |
| Roundup | MFDs that work for business | 62 |


## regulars 67


| | | |
|---|---|---|
| Broadband | Broadband news and directory | 67 |
| OS Challenge | A look at Hardy | 86 |
| Exploding Tech | Lenovo ThinkStation S10 | 88 |
| Insight | Inside Visual Studio | 90 |
| Ask APC | Tech help | 92 |
| Masterclass | Managing your Linux server | 98 |


## workshops 102


| | | |
|---|---|---|
| Blu-ray | Build a Blu-ray phaser | 102 |
| Networking | Network sharing in Vista | 104 |
| Linux | Secure Linux routers | 107 |
| PHP | Create CAPTCHAs in PHP | 110 |


## downtime 112


| | | |
|---|---|---|
| Gear | The coolest tech to watch out for | 112 |
| Games | Assassin's Creed; Resident Evil: The Umbrella Chronicles; Half-Life 2: Episode Two; Portal | 114 |
| Chip Chat | The lighter side of IT news | 116 |

# on the dvd

## BONUS SOFTWARE FOR *APC* READERS

SOFTWARE | SECURITY | GAME DEMOS | LINUX







### ADVERTISERS' INDEX


| | |
|---|---|
| Acebit | 73 |
| Altech | 120, 121 |
| Anyware | 122, 123 |
| AOC | 55 |
| Brother | 11 |
| Cisco Linksys | 13 |
| Cooler Master | 5 |
| Corel | 51 |
| Corporate Technology | 126, 127 |
| D-Link | 17 |
| Epson | 2, 79, 132 |
| Fortune Tec | 118 |
| Gigabyte | 21 |
| Hewlett Packard | 17, 83, 85 |
| Hosting Networks | 117 |
| Hosting Shop | 130 |
| i-mate | 45 |
| LG | 39 |
| MSI | 23 |
| MultiplicID | 130 |
| New Magic | 43 |
| OKI | 65 |
| PC1 Case | 119 |
| Pioneer | 131 |
| Ricoh | 63 |
| Scorpion Technology | 124, 125 |
| TEG | 128, 129 |
| Telstra | 7 |
| TPG | 19 |


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# editorial



TONY SARNO

In our cover story, we've likened the release of Vista Service Pack 1 (SP1) and Windows Server 2008 to a rescue squad for Vista. SP1 upgrades the Vista kernel, and Server 2008 finally makes the OS a better bet for business. In fact, Vista makes sense now in a way that it didn't a year ago. Which begs the question: why was it released then when it would have been much stronger a few months down the track?

We all know that Vista has not been the universal success that was expected, and even Bill Gates himself admitted it earlier this year in some off-the-cuff comments at CES. When Vista launched, it became very obvious that many hardware component makers hadn't released drivers for it (or had released buggy ones), it was incompatible with many existing applications, it had the annoyingly useless User Account Control feature, it used more resources than XP, and file copying in some instances seemed unbearably slow compared to that in XP.

It wasn't as if Microsoft had to launch Vista because Redmond's Windows market share was under realistic threat from any other OS. Microsoft could also easily have held Vista back and released it with the same industrial-grade kernel as Windows Server 2008 (which is what SP1 transplants into it). Just in the area of file copying alone — one of the bugbears of early Vista users — SP1 confers massive speed improvements. And, in a corporate environment, major features like Network Access Protection, server file searches, locally spooled print jobs, locally cached offline files and centrally stored event forwarding are fully supported only by a WS 2008/Vista SP1 combo.

Indeed, early business adopters of Windows Server 2008 have told *APC* that improvements over Win Server 2003 are so massive that a quick migration to the new server platform is inevitable — and this will also continue the legitimisation of Vista by dragging it onto corporate desktops at XP's expense. Where a reinvigorated Vista and Win Server 2008 won't have much of an impact is non-Windows environments. As our story on WS 2008 points out (page 76), Microsoft's new server platform is only now offering benefits available to Linux, Unix or NetWare users for years.

And, while we're on servers, we bring you a roundup of small business servers (page 56). What's exciting is that the sophisticated technology found inside them was available only in enterprise-level machinery a year or two ago.

And last, but not least, the eagle-eyed among you may notice that one of our new columns in the Technotes section has changed its name to The Pinkies. Some of our readers objected to the term e-Penis, while others thought it was a hoot. So, we believe we've found a good compromise.

*tsarno@acpmagazines.com.au*

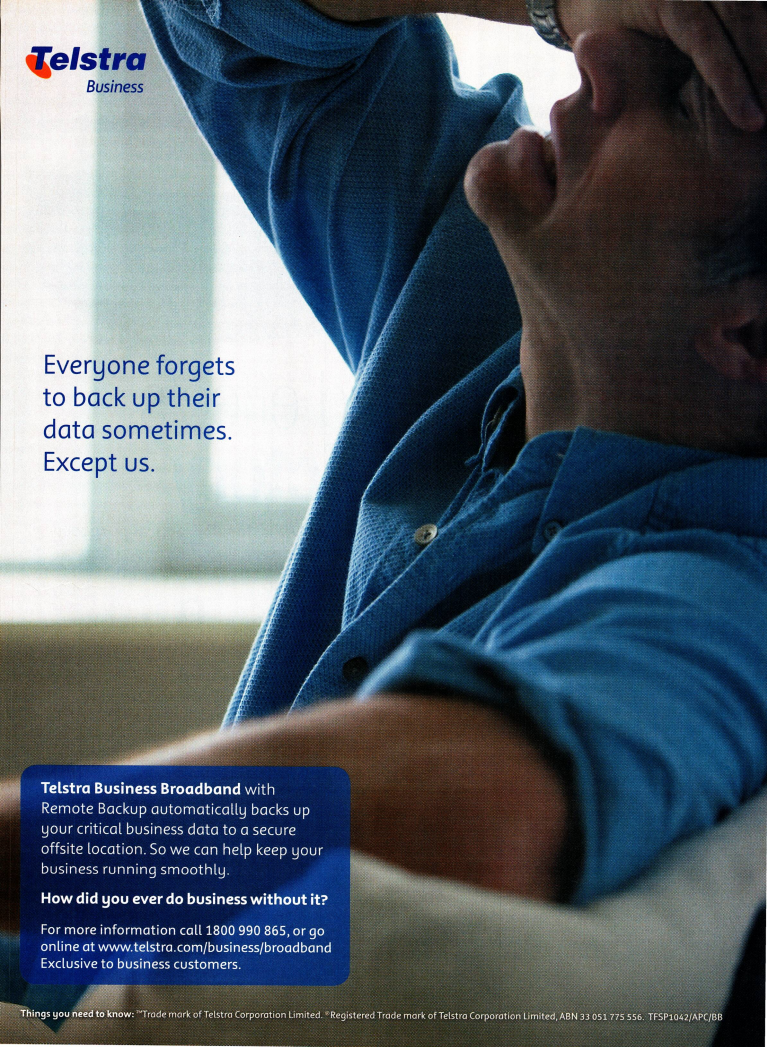
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So there's only one format now: but what does that mean to consumers?

# Five unexpected effects of a Blu-ray victory

**Toshiba has officially thrown in the towel and HD DVD is, for all practical purposes, no more. For consumers, it looks great that the war is over, *Angus Kidman* gives five consequences of a Blu-ray victory that you might not have considered.**

## 1 REGION CODING IS STILL ALIVE

While HD DVD had no regional restrictions, Blu-ray maintained the studio-friendly approach of coding titles so that they would only play in particular regions (albeit with a three-region approach rather than DVD's four, placing Australia alongside Europe rather than South America). In practice, the vast majority of titles were released region-free, but if there's only one option — and hence no chance of defecting to a rival — what's the bet it starts appearing more frequently?

## 2 JAVA GETS EMBEDDED IN YET ANOTHER PLATFORM

One of the original points of contention between Blu-ray and HD DVD was the way in which interactive components would be coded. Blu-ray used a Java derivative called BD-J, while HD DVD favoured HDi, essentially a combination of ECMAScript and XML developed by the HD DVD consortium. Amongst developer types, there was consensus that Sun's approach was potentially more useful, working as it did with a relatively open standard supported by a wide range of tools. For consumers, the picture is murkier, as there have been reports that not all BD-J features work on all players. The use of Java does mean that the specification can theoretically be upgraded if the hardware supports it, which offers an advantage to PlayStation3 users if nothing else.

## 3 PORN PRODUCERS WILL HAVE TO WORK HARDER

It's widely assumed (though without much in the way of, ahem, hard evidence) that one of the reasons VHS beat Betamax was the widespread (ahem) availability of porn on the former format. In the HD format wars, the picture was less clear. Online media fell over themselves last year to report that Sony had banned Blu-ray from being used for porn, but the truth was a little more prosaic. While individual manufacturers are free to reproduce whatever titles they like, their contracts with specific movie studios might prohibit any X-rated material being reproduced on the premises.

## 4 YOU STILL PROBABLY CAN'T PLAY CDs

One problem with both HD formats is that the rush to produce hi-def pictures wasn't always matched with attention to detail when it came to other formats. Thus, despite the fact that both rivals had discs the same size as audio CDs (and hence, in turn, DVDs), a surprising number of players couldn't actually play music from a CD. Given that a $50 DVD from the dodgy store round the corner can manage that feat, it's a surprising omission. This isn'tsomething that affects all players, but it's worth checking.

## 5 SONY HAS WON A FORMAT WAR FOR ONCE

A constant point of reference during the Blu-ray/HD DVD battle has been the similarities with the VHS/Betamax battles for home video cassette supremacy in the early 1980s. Sony lost that particular fight, and that helped create a perception that Sony-backed formats rarely succeed in the market. Various other media formats such as Memory Stick, MiniDisc, DAT and UMD reinforced that impression, although in truth none of those ever looked like serious contenders. Unfortunately, Sony can't afford to gloat despite HD DVD's disappearance. While high-capacity Blu-ray discs might well be a useful storage medium, flash technologies are evolving rapidly and downloading movies via broadband is becoming increasingly viable. Perhaps the salient lesson from the original video war is that no format lasts forever.

# Truth behind Wi-Fi

***Martin Cooper*** **investigates recent shock claims that viruses could be spread city-wide by mass cross-infection of routers, then goes home to change his network password. Just in case.**

Using a new type of viral attack, it could take hackers less than two days to control the majority of Wi-Fi routers in a city the size of San Francisco — so claims an academic group from Indiana University. The attack involves creating a firmware level virus which automatically installs on a router, compromises it and hops to a neighbouring access point. It then repeats the process.

With a large number of routers resembling small Linux machines, complete with shell access and hackable firmware, it's not surprising that nefarious users have embraced them as a hacking challenge. And thanks to the high concentration of routers in built-up cities, the contagion could spread like wildfire. Virus analysts remain sceptical of the attack's viability but warn of equally dangerous Wi-Fi threats.

Arguing that "[Wi-Fi] routers are the perfect platform to launch a number of fraudulent attacks that previous security technologies have reasonably assumed unlikely," the Indiana group's nightmare scenario relies on several events. Firstly, for the malicious code to begin travelling between routers, they must be left on their default login and password settings. This isn't usually an issue with ISP-supplied routers, but shop-bought models are quite vulnerable in this respect. If these passwords have been changed, the router must instead hack WEP encryption — but that's easily broken. If a router employs WPA encryption or has a new and strong password, the Indiana theorists reason, it would be more or less immune.

As with any form of viral contagion, the number and concentration of potential hosts gives the attack its potential for nightmarish devastation. In modern cities there are a lot of routers, and that number is ever-growing. The Wireless Geographical Logging Engine (WiGLE) is an online database showing the geographical location of wireless routers worldwide, together with their encryption settings (**www.wigle.net**). At the time of writing, WiGLE had location details of 13 million unique wireless networks. Around six million of the routers surveyed used WEP, and two million had telltale default SSID settings.



**Using the Wireless Geographical Logging Engine (WiGLE) database you can see how densely packed routers are in cities — here's Manhattan Island.**

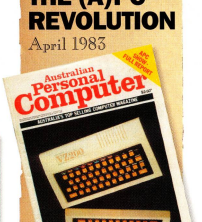
Speaking to *APC*, Greg Day, a McAfee Virus analyst, explained that the attack was "theoretically possible." But is it real? Is it a threat today? "We have seen bits of malware which work at the same [firmware] level… and some try to wipe the BIOS," he suggested. Day was however sceptical about the attack's real-world feasibility. Firstly, he explained the fact that some router manufacturers (and, indeed, ISPs) are shipping hardware with logon and password details unique to each device — which would defeat the attack before it could even start.

Vitaly Kamluk (Virus Analyst, Kaspersky Labs) gave another, more grounded perspective. He agreed that the attack was theoretically possible but stated: "It is unlikely that this kind of virus will appear soon… As there are so many different routers and different vendors… to make the virus succeed it would need to support dozens of different platforms with dozens of different firmware versions." In this sense, it's probably quite fortunate that there is no 'universal firmware' shoring up the software end of our wireless routers.

Day also reasoned that if hackers did manage to intercept all the Wi-Fi chatter in a city, it would be an unimaginably complex task for the criminals to process it all and tease out anything of financial value. But, despite the holes in the Indiana group's theory, both Day and Kamluk were united in their belief that Wi-Fi could be the equivalent of manna from heaven for hackers looking for a new kick.

## THE (A)PC REVOLUTION

April 1983




### NEW IBM PC

IBM launched their new IBM PC XT at the *APC* Show last month. The basic price of $7,892 includes a 10MB hard disk and eight expansion slots. Additional features are an asynchronous communications adapter, more powerful DOS and application software and increased maximum RAM to 655K.

### VZ 200

A colour computer for less than $200? It sounds hard to believe, but Dick Smith has done it with the VZ-200, which will be released in Australia towards the end of May. Manufactured in Hong Kong to Dick Smith's specifications, this small computer is certain to send shivers of dismay up the spines of dealers in other small computers, such as the Vic-20 and the Sinclair Spectrum.

### PC COMPATIBILITY IN QUESTION

Accusations of "foul play" against IBM are starting to appear amongst manufacturers of lookalike micros, who claim the giant has deliberately modified PC DOS in order to prevent IBM software from running on rival machines. However, at Microsoft, where both PC DOS and MS DOS are written, Bill Gates believes the level of compatibility is very high.




## "WI-FI AND JAILTIME TO GO, THANKS. . ."

Puzzled by an unusually slow Wi-Fi broadband network at her home last month, a resident in the UK town of Tweedmouth looked out in the street to check whether her local telco was doing work on the telephone lines. That's when she noticed a car out the front with two men busily using their laptops.

They seemed oblivious to the fact that this would be considered unusual by anyone walking by in the quiet street of this small town. The householder immediately suspected they were using her Wi-Fi connection and called the constabulary. Both men were arrested for dishonestly obtaining a communications service and were put on bail pending further enquiries.

The Berwick Neighbourhood Inspector Sharon Stavers told the Berwick Advertiser : "This is a very unusual offence and it is worth reminding people who use a wireless connection to ensure they follow the manufacturer's instructions when setting it up. They should make sure that all the security systems are in place to keep their computers safe."

The two men admitted they'd been using the Wi-Fi illegally to check email and surf the net. Dumb and dumber could have driven a couple of streets further and parked outside one of the local pubs with free Wi-Fi access.

**Want to nominate a dumbest moment in tech?** Send an email with the subject line "Dumbest Moments"to ***apcmagazinefedback@acpmagazines.com.au.*** All correspondence becomes the property of *APC.*

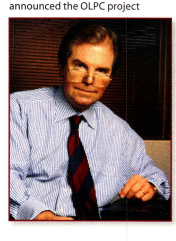
# Intel's laptop **strop**

**The shaky-footed One Laptop Per Child project might as well rename itself One Big Row Per Month, suggests *Gary Marshall.***

On a move reminiscent of rock stars arguing over who gets to headline a charity concert, Intel has split from the One Laptop Per Child (OLPC) project. It's not a happy split, either. Both sides are currently conducting a war of words through the media, with Intel alleging that OLPC demanded it bin its own Classmate project for developing countries and OLPC accusing Intel of dirty tricks. Via *The New York Times*, OLPC founder Nicholas Negroponte claims that an Intel rep tried to undo OLPC's biggest order to date, 272,000 laptops for the Peruvian government, by urging officials to buy Intel Classmates instead.

Intel was a late arrival to OLPC. It initially dismissed OLPC's XO PC as a 'gadget', and Nicholas Negroponte accused the firm of trying to wreck the OLPC project. In late 2007, the two sides buried the hatchet, causing Negroponte to announce that "Intel [has joined] the OLPC board as a world leader in technology, helping reach the world's children". Within months, the love-fest was in tatters. If the Intel/OLPC arrangement was a marriage, it was a marriage inspired by Britney Spears.

The public bickering is all very unseemly, and it's hardly helping a project that's failing to live up to its own hype. When Negroponte announced the OLPC project in 2005, he predicted sales of up to 10 million units by the end of 2007 and 150 million users by 2008. To date, sales are hovering around the half-million mark — "Lower than I'd hoped," Negroponte told *Business Week* with some understatement.



**Nicholas Negroponte peers over his glasses at those Intel yobs.**



**For the foreseeable future, you won't be seeing any OLPCs with Intel chips. You will, though, see a number of Intel-based Classmate PCs. Coincidence?**

It's a shame that OLPC's clever technology — an impressive LCD, a very user-friendly operating system, mesh networking and tiny power consumption — has been overshadowed by a parade of problems. Manufacturing costs were considerably higher than originally predicted, pushing the price from $100 to nearly $200 per PC, and high-volume contracts remain thin on the ground. While Peru has ordered just under 300,000 units, some of the biggest markets are unimpressed: China hasn't bought any, and the Indian Ministry of Education decided in 2006 that it'd rather spend its cash in the classroom and on teachers than buy a bunch of basic laptops. In what many observers saw as a sign of desperation, OLPC reneged on its original pledge not to sell its PCs in the developed world and announced Give One Get One, a project whereby Western geeks could buy an OLPC laptop and donate a second machine to the developing world. OLPC suggests that around 150,000 machines have been donated through the program.

So will Intel's departure damage the project? OLPC says no, but losing Intel's cash — and its marketing muscle — isn't going to make OLPC's job any easier, particularly if Intel is going to use its massive resources to target the very same markets. While Negroponte remains bullish about OLPC, he's revising his predictions downwards. As he told the NYT: "If I can sell 1.5 million computers in Iraq, Afghanistan and Ethiopia, I will feel a lot better than other sales we might make."




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# The Pinkies

**What technologies raise your bar and make your mates envious? The better the tech, the bigger your tool.**

With the hype surrounding the impending Australian launch of Apple's iPhone, it's easy to forget that other phone vendors are not staying still.

In fact, in our test of the phones likely to ambush the iPhone (page 48), *APC* writer Jenneth Orantia points out that Nokia's N95 with 8GB of storage will trump the iPhone in nearly every feature.

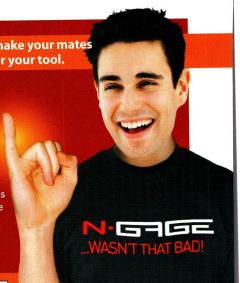
In addition, the N95 also provides what the iPhone in the US currently doesn't: inbuilt-in A-GPS, 3G, HSDPA and DVD-quality video recording, making it a more genuine universal communicator.

The N95 also has a five-megapixel camera with a Carl Zeiss lens and a sharp 2.8in QVGA display, good speakers and a 3.5mm headphone jack — so it's also a portable entertainment centre.

That's enough to make us choose it ahead of the iPhone, but wait, there's more.

It comes with software — including Quickoffice for viewing and editing Word, Excel and PowerPoint files, RealPlayer for playing movies, and Nokia Maps for satellite navigation.

The downside? The N95 is twice as thick as the iPhone, so Jenneth argues it's not as pretty as the Apple product. But, at *APC*, we don't care about pretty — we care about substance, so Nokia's N65 8GB gets a straight pinky this month.




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Nokia's N95 **large**






**Want to show off your gear?** If you think your equipment deserves special attention then send an email describing why, along with a photo of yourself (face only please!) to "The Pinkies" at ***apcmagazinefeedback@acpmagazines.com.au*** All corres. becomes the property of *APC*.

# Hi-def hacked

**AACS, the high-definition disc security once thought impregnable, may have an unfixable flaw.**




Like computer security, copy protection is an arms race: content providers devise a protection system, hackers crack it, content providers fix it, hackers come up with another crack... But, the latest cracks for high-def formats may be unfixable.

Blu-ray and HD-DVD discs use the AACS copy protection system. If the disc is cracked, AACS issues a patch that fixes the problem and 'revokes' unpatched players. That's what happened when Corel updated its WinDVD software to fix an exploit. The update was mandatory; if you didn't apply it, your HD-DVD player refused to play content created after the update was released. However, according to posts on the Doom9 forum (**http://forum.doom9.org**), there are ways to get around that.

Doom9 member 'awhitehead' writes: "With [the] discovery of undocumented debug commands in Toshiba ODD firmware, we discovered that no matter what software is used to read the contents of the optical disc, regardless if it's revoked or not, we can always convince the drive to read [the] contents." And revocation isn't the only issue: Doom9 users have found ways to bypass AACS authentication.

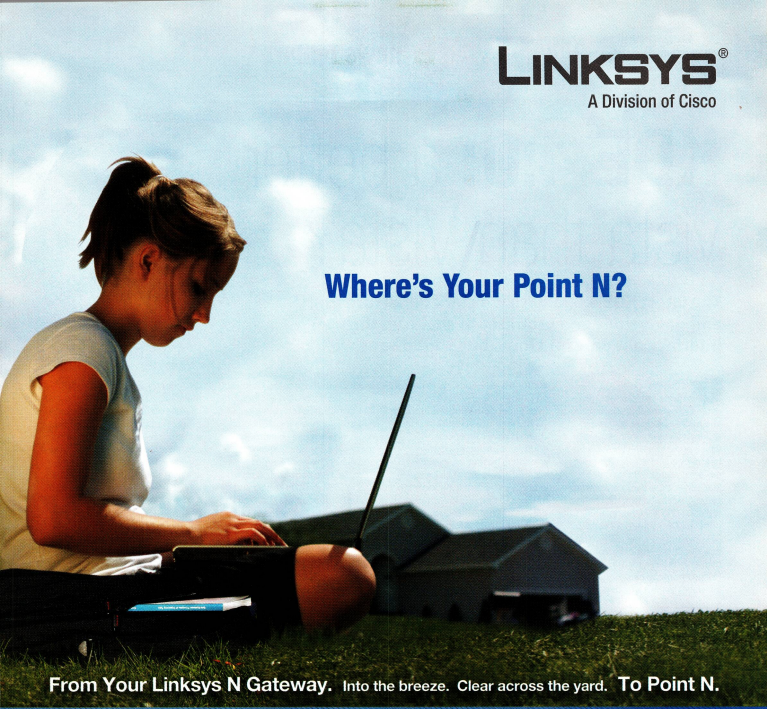
AACS prevents unauthorised software or devices from decrypting content, and prevents playback of content that doesn't have the right authentication keys. However, by tweaking an Xbox 360 HD-DVD drive, Doom9 user Geremia found a way to extract one of the keys without going through the authentication process. That means it should be possible to play unauthorised copies on AACS-compliant devices without changing the machines' firmware.

The hack isn't simple and only works on a per-disc basis, but it's the latest crack that give hackers a better understanding of how AACS works and, in turn, how to get around it.




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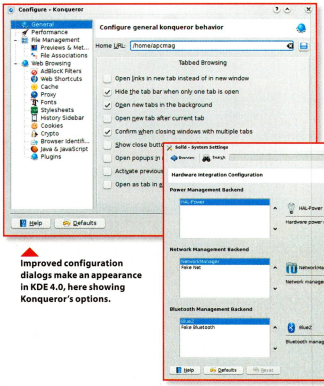
# KDE 4.0: a better vista than Vista?

**The latest KDE 4.0 release is a stark departure from earlier versions and promises to shake up the user interface not only for Linux, but Windows as well.**

It's not every day that an established interface gets an extensive overhaul. It's both brave and risky — because while new ground can be charted, ground which perhaps hasn't been covered before by any of the interfaces we use across Linux, Windows and Mac OS — it could also drive away current users who find the change too drastic. KDE 4.0 has taken the popular KDE 3.5 interface some of us know and love and shifted it in a new direction — one that promises to give Vista a run for its money. Not just from the perspective of interface design, but also on the platform itself — while originating on Linux, parts of KDE 4.0 can be used under both Windows and Mac OS X as well. Given Vista's interface changes have caused seasoned Windows users to throw their arms up in frustration, can KDE 4.0 succeed where Vista fails? And will Linux users flock to it, or find it too foreign? To find out, we installed the latest KDE 4.01 release under Ubuntu and took it for a spin.

## THE K DESKTOP

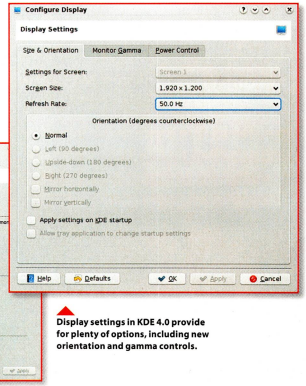
Environment KDE started life in 1996 as a desktop environment for Linux based around the Qt toolset by Trolltech. At the time the Qt toolset was closed source but allowed for free distribution of its binaries, and KDE copped a lot of flack for choosing such a key component that might one day change its tune and either charge licensing fees or cease development. In light of this, in 1998 the KDE Project and Trolltech founded the KDE Free Qt Foundation to ensure that, even if Trolltech should disappear, KDE would have the right to keep using and developing Qt. However, the toolkit remained proprietary on Windows and Mac OS X platforms until 2005, with the release of Qt under the GPL. Trolltech still maintains a proprietary edition that charges licence fees for commercial programs, but the free GPL edition makes it possible to create free cross-platform programs using the toolkit, as long as the programs are also released under the GPL. Which is precisely how parts of KDE 4.0 have already been ported to Windows. Qt is also cross-platform and is used by Opera, Skype, Google Earth, embedded devices and other applications. By contrast, the other major desktop environment for Linux, GNOME, which is used in distributions like Ubuntu, makes use




**Improved configuration dialogs make an appearance in KDE 4.0, here showing Konqueror's options.**

**Configuration from Solid is a bit bare at the moment, but it shows the potential to selectively choose different back ends for KDE, as detected by the hardware layer.**




**Display settings in KDE 4.0 provide for plenty of options, including new orientation and gamma controls.**

of the open-source GTK+ toolkit, initially developed for the GIMP graphics application.

### SETTING KDE APART

KDE 4.0 is a significant departure from the previous 3.5 series. So much so, in fact, that most KDE applications will need to be ported to properly take advantage of the features it offers. And, on that note, a number of new components make up KDE 4.0, primarily:




### Plasma

Plasma aims to bring useability, innovation and beauty to the desktop — so says the project page (**http://plasma.kde.org**).

A key tenet of Plasma is to treat the desktop like an interactive layer to the OS, as distinct from UIs like Windows Explorer and the GNOME interface where the desktop is a filesystem view of the machine. What most users will immediately notice however are some of the new features Plasma brings — compositing and widgets. In less geek terms, compositing refers to accelerated effects like transparency, picture in picture, and snazzy displays like window shrinking and stretching. The KDE display manager, KWin, manages much of these and, while it sports some of the same features as Compiz (which users of Ubuntu will be familiar with), it's actually quite separate, and the two are not compatible. You *can* run Compiz on KDE, but it's not as tied as KWin is to the interface. Widgets, also called *plasmoids*, are mini desktop applications like system monitors, clocks, news tickers, battery status and so on. For Linux users, these resemble SuperKarumba and gDesklets; for Windows users, think Vista Sidebar — only you can drag the gadgets anywhere on the desktop. Importantly, another feature of Plasma is 'data engines' — modular code to do things like CPU monitoring or report on application status. These engines can be used in multiple programs, freeing developers from writing common code for every new application and instead calling on KDE's built-in engines. Plasmoids tie into engines to pull on the data they show. Plasmoids themselves are more than just gadgets to be played with on the desktop: they

## WHO MAKES KDE?

**KDE is produced by KDE e.V., a non-profit organisation that represents the KDE Project. As an open source venture, its developers herald from all over the world. In all there are some 800 contributors to the project, with the code itself consisting of over four million lines of coding, according to the project homepage. KDE has been translated into 88 different languages, and new releases are mirrored on over 100 FTP servers situated in nearly 40 countries around the world.**

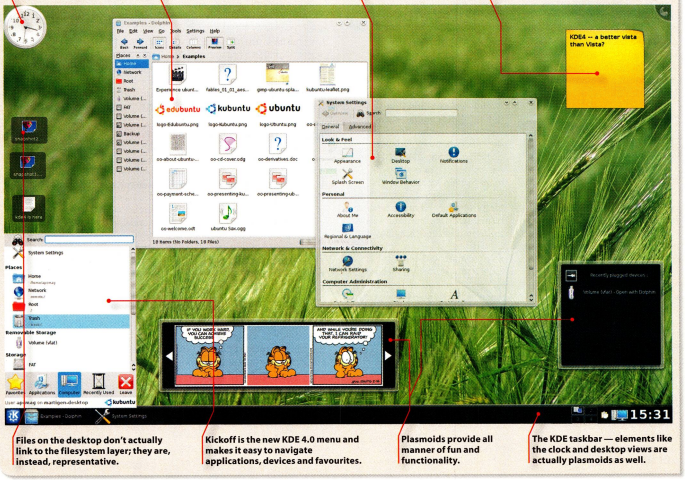
## A VISUAL TOUR

**The SVG clock is actually a plasmoid that can be dragged anywhere on the desktop.**

**The new Dolphin file manager provides advanced features such as a crumbed path bar and split filesystem views.**

**Transparency effects are among the accelerated graphics features.**

**The Plasma icon here expands when hovered over and allows you to add widgets or select the Desktop Grid mode.**




**Files on the desktop don't actually link to the filesystem layer; they are, instead, representative.**

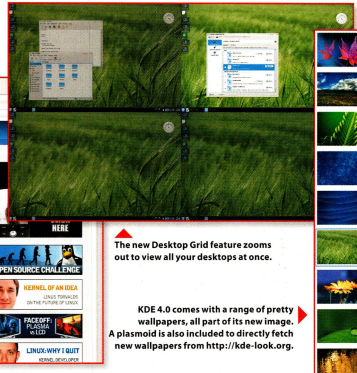
**Kickoff is the new KDE 4.0 menu and makes it easy to navigate applications, devices and favourites.**

**Plasmoids provide all manner of fun and functionality.**

**The KDE taskbar — elements like the clock and desktop views are actually plasmoids as well.**




Home sweet home: www.apcmag.com through Konqeror in KDE 4.0.




The new Desktop Grid feature zooms out to view all your desktops at once.




KDE 4.0 comes with a range of pretty wallpapers, all part of its new image. A plasmoid is also included to directly fetch new wallpapers from http://kde-look.org.

are a key modular component of KDE 4.0 — the bottom panel that contains the KDE menu, virtual desktops, network status and clock are all plasmoids. Just as with data engines, plasmoids can be embedded in any application as well, allowing developers to take advantage of plasmoids as modular functions.




### Phonon

Phonon is a re-working of the multimedia layer, and aims to provide a simple API for developers to access KDE's media capabilities. It also helps seperate the media layer from individual applications that need it, providing the possibility for discrete volume controls for applications or application groups (such as video, music, communication and so on). By interacting with Solid (see below), Phonon can even automatically select audio devices as they are plugged in. Finally, Phonon supports multiple pluggable backends, and by default uses Xine under Linux. However it can also support a Directshow backend for Windows and Quicktime backend for Mac OS X, further its capabilities on these platforms.




### Solid

Solid is KDE's interface to the underlying hardware, pulling in information from HAL (Hardware Abstration Layer) and D-bus (inter-process communication). It provides a mechanism to query and manage hardware on KDE, including pluggable hardware like USB keys, power management functions and network connectivity. Importantly, for those devices that can be driven by multiple back ends, Solid allows the user to select which one they want to use. Ultimately, Solid helps to make KDE applications more hardware-aware, such as having a media player recognise when an iPod is plugged in and automatically sync the device.




### Oxygen

Oxygen isn't so much an architectural design, but it is an aesthetic one. Representing the look and feel of KDE 4.0, which includes icons, window decoration and button styles, it is as meticulously planned as the other components, focusing on useability and accessibility while looking rather swank. At least, that's the idea. There are a number of other significant changes as well, such as the new Dolphin file manager, which integrates handy features like split-pane view and a directory crumb bar similar to that in Vista. Konqeuror still maintains its web, file and ioslave capabilities as a file manager, but Dolphin is now the de facto. Speaking of which, if you haven't heard of ioslaves, these are one of the most innovative

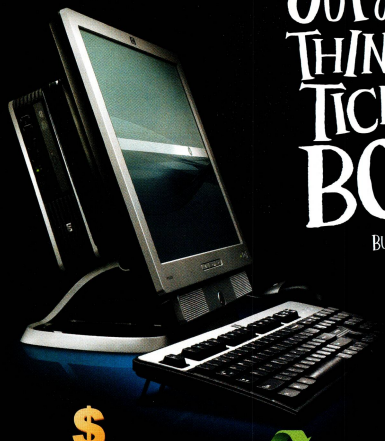
## FIRST LOOK

In using this latest release, a number of conclusions can be drawn: yes, it has some impressive new features and yes its general style appears to take Vista head on, even though it operates quite differently under the hood. However, it comes across a little too disorganised: the taskbar for example mixes different font and icon sizes; widgets have as many as three different coloured borders (black to transparecy to white); the kickoff menu lacks borders while everything else has them and isn't as quick to navigate as it's supposed to be; and desktop icons all seem to have have their own idea of borders and dimensions, making it hard to keep the desktop neat. And, for some reason, some dialogs share the black transparency theme (such as the Alt-F2 run dialog) while others use the defined Oxygen KDE style. All up, the feel of KDE 4.0 at the moment is one of potential (but not polish). That said, and in recognition of this, the KDE developers have called the 4.0 release more of a technology showcase than a production desktop, recommending users wait for 4.1 or 4.2, once it's had a chance to mature. In light of this, we can't be too harsh, but it's important to differentiate between incomplete features, polish and bad design decisions. First impressions are always important if the project wants users to give it a second look in the future, and, as far as first impressions go, it's a mixed bag. With Vista going in a new direction with its interface, and now KDE doing the same, at least we're seeing the desktop being re-invented and, potentially, improved. Vista didn't quite pull it off, so can KDE suceed where Vista fails? We'll have to wait and see.

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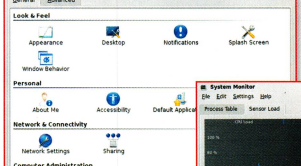
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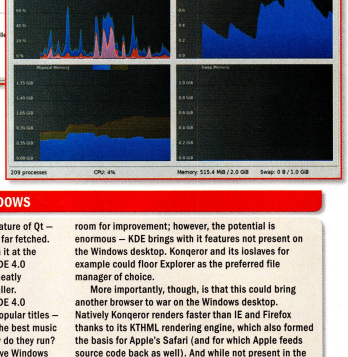
features for any desktop — acting as a series of protocols, you can enter into the address bar key words to connect to SSH servers or Windows shares and even browse music CDs as source WAV files — where you can do nifty tricks like drag these virtual files to the desktop and they will be automatically encoded to MP3 on the fly.

Aside from Dolphin, a number of other applications make a showing. Strigi is a new information extraction and search subsystem that can determine properties of files (such as length of an audio clip or size of an image) and can work within archives. This extends beyond simple metadata to properties within the files, and this is integrated with its indexing capabilities to provide greater information about the files on your system. Okular is KDE's new view-anything document manager that can view OpenOffice word and presentation files, PDFs and more. Gwenview is a new multi-purpose image manager and viewer, and the default viewer when images are selected. Also new is the tile-based KDE Settings Manager, replacing the older tree-driven KControl.

Lastly, many core and popular KDE applications have been 'ported' across, meaning they've started to take advantage of KDE 4.0 features (for example Kopete, the KDE IM application, or the KGet download manager). Despite all the additions, as a whole, KDE 4.0 actually has a smaller memory footprint than its 3.x predecessor. This is due primarily to the use of the new Qt 4.0 platform but also a re-working of the core KDE libraries. There are performance improvements here too, with the KDE libraries designed to make better use of threading for multi-core systems. All up, the feature set for KDE 4.0 sounds impressive, but does it deliver?




The new System Settings manager using a tile layout.




The new system monitor takes advantage of the updated rendering libraries in KDE 4.0.

## KDE FOR WINDOWS

KDE for Windows with the cross-platform nature of Qt – making a port of KDE to Windows isn't that far fetched. In fact, the release of KDE 4.0 brought with it at the same time a beta release of a number of KDE 4.0 applications for the Windows desktop, all neatly installed via a simple Windows-esque installer.

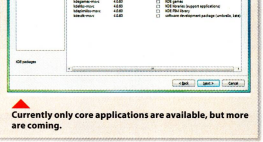
Currently you can install a number of KDE 4.0 applications, including some of the more popular titles – such as Konqeuror and Amarok (probably the best music player/manager for any platform). And how do they run? The actual interface is very fast – with native Windows Qt libraries the dialogs render just as fast as any other program under Windows, but the same cannot be said for the programs themselves, at least for the moment.

The sample games appear to run as fast as they do under Linux, but rendering in Konqeror is slow. Amarok hiccups a bit as it looks for various missing KDE features, but otherwise it looks just the same as under Linux. Understandably, the project is young so there's room for improvement; however, the potential is enormous – KDE brings with it features not present on the Windows desktop. Konqeror and its loslaves for example could floor Explorer as the preferred file manager of choice.

More importantly, though, is that this could bring another browser to war on the Windows desktop. Natively Konqeror renders faster than IE and Firefox thanks to its KTHML rendering engine, which also formed the basis for Apple's Safari (and for which Apple feeds source code back as well). And while not present in the current release of KDE for Windows, when KOffice is ported there will be a whole new office suite on the block for Windows users. KOffice is an excellent suite, and, between OpenOffice and KOffice, Microsoft will have two completely free, fully featured office suites in competition with Microsoft Office. If you'd like to give KDE 4.0 for Windows a spin, head to *http://windows.kde.org*.




The KDE 4.0 installer for Windows.




Currently only core applications are available, but more are coming.

## TRYING IT OUT YOURSELF

If you want to explore KDE 4.0 yourself, we've provided both Kubuntu 7.10 KDE 4.0 Remaster and KDE Four Live 1.0.1 live distributions bootable directly from the cover DVD. Live CDs and DVDs run slower from an optical drive, so, for the full experience, download and install the distro to your hard drive.

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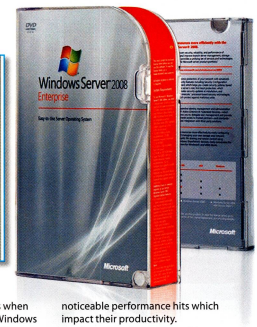
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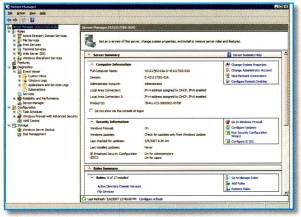
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# Look before you leap

## Windows Server 2008 is just around the corner... what are the implications for Windows Vista deployments?



Server 2008: wait a while and intall it together with Vista SP1.

For those of you who haven't gone down the path of deploying Windows Vista yet, here's a potentially very good reason why you should wait a little bit longer.

### NEW TECHNOLOGY

Windows Vista sports a whole range of new features, and two very important ones are SMB 2.0 and the Next-Generation TCP Network Stack. SMB (Server Message Block) is Microsoft's network file sharing protocol, and has been present as version 1.0 in Windows for quite some time, up to and including Windows XP/Windows Server 2003. SMB 1.0 uses a progressive write request/write response mechanism, waiting for each step to complete before moving on to the next one. SMB 2.0 handles multiple requests/responses simultaneously, making better use of available bandwidth and achieving much higher data throughput.

The Next-Generation TCP Network Stack has been re-written by Microsoft from the ground up. It's designed to do a whole host of things, such as dynamic bandwidth optimisation, automated tuning of the TCP receive window size and advanced congestion control.

All these things are excellent and innovative, but they're only supported on Windows Vista and Windows Server 2008. As with most networking technology, both ends of a network communication have to support the same protocols in order to benefit from any efficiencies that protocol offers.

This has a major implication — Windows Vista runs best in a Vista-only environment (or Vista plus Server 2008). This is certainly in line with the user experience so far. A Windows Vista machine in a Windows XP/Server 2003-dominated environment functions about as well as an XP machine, and sometimes not even. Microsoft's own Windows Server 2008 performance benchmarks demonstrate very impressive gains in data throughput and shell interaction over both high-speed LAN and high-latency WAN connections when the end nodes are Windows Vista SP1 and Windows Server 2008, but only marginal (if any) benefits when one of the end nodes is Windows XP or Windows Server 2003 — communication is handled by SMB 1.0 rather than SMB 2.0. SMB 2.0 is backwards-compatible with SMB 1.0 to deal with such scenarios.

### DEPLOYMENT IMPLICATIONS

Is any of this a reason to hold off deploying Windows Vista? It mostly depends on your environment, but it's well worth considering the implications when 'selling' the concept to managers and users. At the moment, Vista's networking performance within existing infrastructures is unlikely to impress, and may leave users wondering why they've been inconvenienced when there's no obvious tangible benefit. Remember that the visual improvements in Vista's user experience (while enjoyable) won't persuade users to overlook any noticeable performance hits which impact their productivity.

However, when you consider that the timing of Server 2008's release ties in very closely with Vista SP1, there's a definite business case that if you haven't deployed Vista yet, hold off and continue testing with the available beta releases. They are built on the same code, use many of the same technologies, talk the same language and use the same activation model. In many ways, attempting to deploy Vista without Server 2008 is asking for trouble — there's little benefit and plenty of obstacles to overcome. Additionally, the improvements made to Vista with Service Pack 1 suggest that deploying Vista with the service pack integrated is a worthwhile course of action. And of course, deploying a new OS with an integrated service pack is much easier than deploying them separately. BITS



HastalaVista

by James Bannan

*James Bannan is a systems manager at St Leonard's College (Vic) and APC's resident Windows expert. He'll be checking out Vista for you every month.*

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*Ultra Durable 2 Graphics Accelerator Design*



1. Lower RDS(on) MOSFET
2. Ferrite Core Chokes
3. Lower ESR Solid Capacitors

GPU zone Average Temp. **Lower**

**35°C**

*Ultra Durable 2 vs.Traditional Solid Capacitor VGA

| Location | Ultra Durable 2 Graphics Card (Cool) | Traditional Solid Cap Graphics Card (Hot) |
|---|---|---|
| 1 MOSFET ★ | 50.9°C 32.4°C Lower | 83.3°C |
| 2 Choke ★ | 47.5°C 21.5°C Lower | 69.0°C |
| 3 Solid Capacitor ★ | 41.5°C 5.7°C Lower | 47.2°C |

Testing Environment: Run 3DMark 2006 20mins then record temperature. *Under controlled conditions

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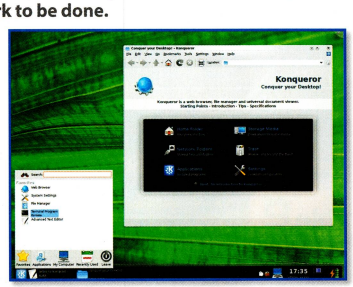
# Splitting the paradigm

**Linux is still failing to deliver the perfect user interface; the new KDE 4.0 shows that there's still work to be done.**

The release of KDE 4.0 is a bit of a mixed blessing — it's great the KDE developers are brave enough to take the traditional desktop paradigm and try to re-invent it, and there are a bevvy of useful innovations in KDE 4.0 as a result. However, the opportunity was there to not just design a new interface but to take another look at how we use our PCs, and in this regard (at least from my exploration of it so far), not a lot has changed.

There's a wide selection of interfaces for Linux, ranging from Xfce, Englightenment, WindowMaker, Fluxbox and even Ion (which really does re-define it), in addition to the big two of KDE and GNOME. Arguably, many of these appeal to a certain subset of user, and KDE and GNOME are the most mature, traditional (read: Windows-esque) interfaces, which is why they are ideal for desktop distributions aimed at new Linux users.

Unfortunately, though the best we have, neither of these is ideal either — where GNOME hides too much functionality from the user to try and keep it simple, KDE doesn't hide enough. A big complaint of GNOME is its lack of configurability, while KDE offers too much — even in KDE 4.0, simple application




KDE 4.0: test drive on page 14.

menus are loaded with options, many of which you never use, and many of which are so similar you wonder why they're listed at all (there's always at least three 'Configure' options for every KDE program for example — when one would suffice, even if it nested the others).

Without trying to get completely flamed here (*waves developers*), it still feels like an interface designed and programmed by developers, rather than designed by *users* and programmed by developers. It seems like an obvious angle to take, but as KDE 4.0 appears to show with its lack of consistency — something that begrudges Vista's interface as well — this is clearly not the case. At least the KDE project didn't spend millions of dollars on it and *still* got it wrong the way Microsoft did.

Perhaps I'm over-simplifying the process, but to me an interface has one, and only one, master: it must *enable* the user, as simply as possible. If the user has to fight the interface to get it to work, work around its design, or figure it out, then it's counter-productive. And key to an enabling interface is consistency — both operational (button functionality, location and naming for example), as well as look and feel (same styles across all dialogs, no matter where they come from, for example, as well as visual styles that don't fight for your attention). But no single interface has managed this yet. Windows XP was quite close, and under Linux GNOME does this better than KDE 3.x or 4.0, but these too have their faults.

Maybe I just have overly high expectations, but for a while I ran Fluxbox on my Linux machine because its simplicity was both easier on the eyes and quicker to use. If you find an interface becomes tiring (Vista = fail here) then it's counter-productive and hindering, rather than enabling, the user.

It's only fair I mention Mac OS X as well, isn't it? While I haven't used it as much as Windows and Linux, I have to say Apple does have a greater understanding of good user interface principles than the Windows and Linux camps. Apple gets it: consistency is everything.

Under Linux, KDE and GNOME have split the desktop paradigm on two sides of overly complicated and too simplistic respectively. How nice it would be to have an interface that walks the middle line. ETTC



> PERHAPS I'M OVER-SIMPLIFYING THE PROCESS, BUT TO ME AN INTERFACE HAS ONE, AND ONLY ONE, MASTER: IT MUST ENABLE THE USER



## LinuxWindow

by Ashton Mills

*Editor of the* **Linux Pocketbooks** *series, and now with CHOICE magazine, Ashton has been a tech journo for over 12 years, including five years with* **APC**.

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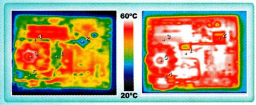


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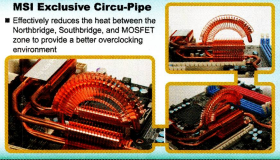
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# Bright light, bright light

**We have officially found the dumbest end user of all time: a caller to a telco tech support call centre.**

Trent Farrell sent us a tape of a conversation between a support operator at a major telco and a user who wanted to set up his PC for broadband. We've edited this extraordinary exchange and run it only after having double-checked that it did come into the call centre.

**Support:** Welcome to Optus Internet, this is Andrew. How can I help you?
**User:** I had a OptusNet CD, I put in drive, but when I put in, it not do anything.
**Support:** Not doing anything at all?
**User:** No, nothing.
**Support:** Is anything open in front of you on your computer screen?
**User:** No no, the computer is closed, it's not open, but you can see inside from the back — do I need to go inside the computer?
**Support:** Do you need to go inside the computer? No.
**Support:** OK, can you turn the computer on for me?
**User:** No, no, the computer is on.
**Support:** OK, on the My Computer picture, I want you to click on that one for me with your right mouse button.
**User:** [silence, then] Hah??
**Support:** OK, you know your mouse, the little thing where you move the arrows?
**User:** The thing with the light?
**Support:** Yeah, that's right, you've got two buttons there.
**User:** Yes, I have a few buttons.
**Support:** Two! Have you got two buttons?
**User:** When I move this, the light shine in my eye, how to make that stop? It's very bright, this red light.
**Support:** A red light shines in your eyes? I don't know what this is, exactly?
**Support:** OK, you know, when you click on something on your computer, you open something up, you use a little mouse.
**User:** Ah, you want me to put that one on the My Computer?
**Support:** Exactly right! And now click on it with the right mouse button, and when you do that, a little menu comes up, right?
**User:** No, it just makes a sound
**Support:** It just makes a sound and nothing happens at all?
**User:** Which side do you want me to put, is it the cord side or the not cord side?
**Support:** Ah... well, what I want you to do is, you know the arrow? That little arrow?
**User:** The light is shining in my eye again, is no good.
**Support:** Ah, it's on the eye again, is it? OK, well, can you move it up a bit so it turns into an arrow?
**User:** Can I put the mouse on the table because my arm is getting sore now?
**Support:** Yes you can.
**User:** Yes? Thank you. Do you want me to do the same thing with the keyboard? I don't know if the cord is long enough to reach the screen.
**Support:** Is anyone with you right now?
**User:** No, or maybe someone here, but not speak too good English.
**Support:** Are they there now with you?
**User:** Want me to get them? OK, one sec... Hello? This is my friend, he no speak any English.
**Support:** That's OK, to be able to create an account for you...
**User:** I want the CD to work
**Support:** I am trying to get the CD to work. But it's a little difficult because you don't know a lot about computers, so do you have...
**User:** Maybe this is a problem, but when I'm trying to put the CD in the drive, is a not fit right... Maybe that is a problem?
**Support:** Yeah, I think that would be a problem.
**Support:** OK, look, what I would do is... where did you get that CD from?
**User:** From the computer man.
**Support:** Are you able to get the computer man to show you how to do it?
**User:** He's not sure either — he's told me that you would know definitely, that you would give me the help to get online.
**Support:** I mean, it's difficult because I don't know exactly what's happening on the computer in front of you.



"OK, OK, you can put the mouse down now, the red light is burning me too."

## EndUser

from The readers of *APC*



Microwave your Outlook on high for 12 minutes, that should fix it.

## IT'S NOT ON [NOT GOOD], NOT TO LET GO IT ONLINE AND THEN NOT SEE THE PRETTY GIRLS TONIGHT, YOU KNOW?

**User:** It's not on [not good], not to let go it online and then not see the pretty girls tonight, you know?
**Support:** Yeah [laughs], yeah. See, it's a bit difficult because I can't tell you what to do exactly, because you don't have a good knowledge of computers? Alright?
**User:** OK, bye.

### HOT OUTLOOK

Rael Cohen from Sydney was looking after technology for a charity in London where there were repeated problems with email and Exchange servers. "One stressful day I urgently had to shut down email gateways and inform all Microsoft Outlook users to log out. The culture of the charity was pretty old, and, in order to broadcast messages, a very old lady would read from a script and blast Tannoy (loudspeaker) messages to all staff. I told the old lady to broadcast a simple message: 'Please can all Microsoft Outlook users log out?' In a monumental moment of hilarity, she called out: "Attention please, attention please — can all *microwave* Outlook users log out?" The roar of laughter from virtually all 240 users was a good way to end a stressful day.

### IT PROJECT MANAGER

Peter Molloy, was contracting for a software house, building a new insurance system for a large Australian company. Shortly after he got involved, he had to demonstrate the latest deliverable to the new Project Manager. Molloy says: "I had never met him before and had no idea of his experience but had, naively, assumed that he would have had some IT background to get a job as an IT project manager." This was a big mistake on Molloy's part. "Once we had got into the test application, he decided that he would run it for himself, which was rather painful to watch as he had never heard of the tab key and used the arrow keys to painfully move his mouse from field to field through the data entry screen. He didn't even realise that holding an arrow key down would move the cursor a lot faster than going tap, tap, tap. . ." After standing by while the so-called IT project manager worked his way through two more screens, Molloy did the honourable thing and feigned a sudden call of nature to give the project manager's staff an opportunity to update him on the latest keyboard techniques. And also, Molloy admits, so he could take several hundred deep breaths to stop from bursting out laughing.



**"Tab is a drink, not a keyboard shortcut!"**

## WINNERS!

This month's published End User writers win a copy of OmniPage 16, valued at $199. This is the fastest and most precise way to convert paper, PDF files, and even digital camera pictures into files you can edit in your favourite PC applications. OmniPage 16 lets you turn paper documents that would take hours to re-type and lay out into perfectly formatted text documents in seconds. You can even turn text into audio files perfect for burning to a CD or listening to on your Apple iPod. OmniPage 16 is ideal for students, home office and small business users alike. No other product delivers more accuracy, speed, features, and formats.




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# Credit where **credit is due**

## One reader questions a perceived commercial abuse of the GPL, but to what extent should distributors be held accountable? Watchdog investigates.

Hello, I refer you to this thread on the Australian 'Whirlpool Broadband Forums': **http://forums.whirlpool.net.au/forum-replies.cfm?t=903816&p=1**.

Billion has a reputation for quality hardware, eg. Billion's BiPAC 5100, BiPAC 7300G and BiPAC 7404VGP have all won the *APC* Editor's Choice awards (they're just the ones I can think of off the top of my head).

My question is, since hardware is only as good as the firmware that lies underneath it, to what extent can Billion's reputation be attributed to using these GPL libraries and programs?

I think it's a shame that a reputable(?) company like Billion can't give credit where credit's due. I'm sure, when the company reps accepted the awards, there was no: "We would like to acknowledge the work done by programmers who receive no financial gain from Billion in making our hardware as successful as it is…"

Programmers release their GPL code in good faith. In return, commercial entities profit from their work and act in bad faith by not abiding by the terms of the licence.

'Extremely disappointing' is an understatement.

***Marcus Anderson***
***Croydon, Vic***

*We forwarded Marcus' criticisms to PC Range, Australian distributor of Billion modems and routers. CEO Raaj Menon, previously featured in APC's 'The Creators' (APC September 2006, page 26), had this to say in response:*

### Dear Watchdog,

We have all the GPL codes made available. Information on how to obtain the GPL source code is available at **http://billion.com.au/support/bipac7300.php**. All they need to do is send in $9.95 and we will send them a CD with all the GPL code for the models which are available and required for. The models available are the BiGuard series and the 73XX series. All other models do not use GPL code. So I am not sure why the user is complaining. I guess the user hasn't been reading up on the Billion Forums.

Here is the text in that link: "GPL [**www.gnu.org/licenses/old-licenses/gpl-2.0.html**] licensed source code is available for the BiPAC 7300 Series. To request a copy of this source code, send an email to sales@billion.com.au with a subject of '7300 Series Source Code'. A $9.95 shipping and handling fee applies. Australian customers only. For all other countries, please contact Billion Taiwan."

***Raaj Menon***
***CEO***
***PC Range***

*Mr Menon added that he thought it strange that a reader sent us the complaint, as "we have made it clear in Whirlpool that we have made the source code available." When we informed him of PC Range's response, Marcus told us:*

*"Yes, I am aware that Billion has now made the source code available. The issue is that they only made the source code available* ***after*** *they were caught out, thanks to a developer of the GPL software they use in the router checking the contents of their firmware updates.*

*"So, yes, we have a rep telling us that 'All other models do not use GPL code', but Billion has lost its credibility because they didn't adhere to the licence agreement from the beginning.*

*"If this was a genuine mistake, why not write an open letter of apology to the developers who wrote the software they profited from and whose licence agreement they did not abide by? Instead, they release the code and pretend that nothing happened.*

*"I'm complaining because Billion has treated these open source developers with contempt by not abiding by their licence terms, and they have reps who pretend their s__t doesn't stink."*

*In response to Marcus' continued criticisms, Mr Menon deferred to his original statement but told APC that: "It [the source code] was made available when the users asked for it. Even I wasn't aware it was GPL code, so how am I to make an apology when PC Range — the exclusive distributor — did not know about it. It's now available for anyone who wants it."*

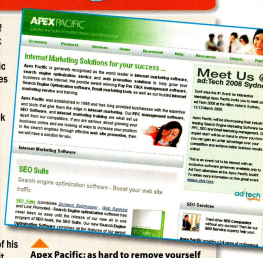
***Watchdog's take:*** *readers are encouraged to read further in the links provided and make their own minds up about these events — but, regardless of any rights or wrongs in this particular situation, this incident with Billion highlights the strict adherence to the tenets of the GPL which those in the open source and programming community will expect from commercial interests.*




**Keep your eyes open: vendors should be aware that non-observance of the GPL is strictly monitored by the community.**

## "HAVE YOU GOT ANYTHING WITHOUT SPAM IN IT?"

Chad Ledden of Wahroonga, NSW, wrote into Watchdog after experiencing a neverending series of unsolicited emails from internet marketers Apex Pacific. As he told *APC*, he replied to Apex Pacific in turn with numerous email requests to unsubscribe from their newsletter. These requests amounted to several separate emails sent to the marketers over the period March 2007 to January 2008. Chad alluded to the fact that he may have even sent more than this, but, for our purposes, was providing records from only one of his PCs. All of his unsubscribe requests were sent to the appropriate email address: unsubscribe @dynamicinternetmarketing.com. Chad even received confirmation of his unsubscription in an email which stated that his address had been removed from their mailing list. However, this was soon followed by more marketing material. Watchdog approached Apex Pacific to question them over the seeming deficiencies in their unsubscription procedures and received the following reply from Barbara Mesar, sales and marketing manager: "Thank you for your email. This individual matter was resolved with the client on 15 January when I replied to him via email that we had indeed put measures in place to avoid this client receiving any emails from us in the future. We had identified the cause and immediately moved to resolve the matter. The client has not received any further emails from Apex Pacific. He has been permanently removed from the Apex Pacific database and we have deleted his contact details, thus avoiding any future delivery of emails to the client from Apex Pacific. The client received a confirmation from Apex Pacific detailing the specific outcomes of this matter and how it had been resolved. Should you personally wish to cross-check our unsubscribe process I urge you to sign up to our Newsletter and attempt to unsubscribe." In light of Chad's experience, Watchdog declined this invitation. Chad later confirmed that since January he had not received any emails from Apex to any of his email accounts: "I think that it has finally been resolved, but it shouldn't have taken so long."




**Apex Pacific: as hard to remove yourself from as SPAM is from your digestive tract?**

### THE PINNACLE PICKLE

I recently needed to contact Pinnacle Support and have found their customer service solution is nothing short of farcical.

I use Windows XP SP2 with Pinnacle Studio Plus — 700 PCI. It came with Version 7 of the Studio software, and I have applied the updates to bring it up to version 10.7. I purchased activation keys for MP3 encoding/decoding, Dolby Digital 5.1 channel operation, MPEG-4 encoding/decoding and RTFX Volume 1. Recently, however I had to format my hard drive and reinstall everything from scratch. I had copies of all my activation keys but they wouldn't work.

When I log in on their site, all it has on record is a freebee effect and none of the effects I had paid for. I tried to contact customer service to query this, but I cannot find any hint of an Australian agent to contact. The online help just informed me that, as I was not using version 10.7 (I was and had said so), the matter was considered closed and nothing further would be done.

Pinnacle is marketing its products in all the major stores now, and if they are going to be almost uncontactable about this sort of thing I really think people should be made aware of it. It is absolutely ridiculous. I would certainly never consider upgrading, purchasing or recommending another Pinnacle product unless their service improves a great deal.

***David Wild***
***Gladstone, Qld***

*APC had more luck getting through to Pinnacle, who offered the following:*

### Dear Watchdog,

Thankyou for your email, and I'm sorry to hear about David's issues with obtaining activation keys for additional plug-ins which he purchased. I have forwarded David's email to our technical support manager in Singapore Mr. Soo Yu Shen, who will assist him with obtaining activation codes.

Furthermore, I personally called David yesterday and sent him a complimentary product, which will enable him to continue his video editing work.

I will be in touch with David over the course of next week to ensure that his issues with Pinnacle products have been promptly resolved.

***Peter Dudkowski***
***Sales Manager***
***Pinnacle Australia***
***and New Zealand***




**Not happy, Jan: what to do when all your updates disappear (and nobody is around to help)?**

*David confimed to Watchdog that he received in the mail a copy of Studio 11 Ultimate Edition: "Which is more than I would have expected… It works well and comes already supplied with most of the premium content I was missing. So it appears that my particular problem has been solved. However, Pinnacle needs to make a non-automated way of contacting them available. Automated responses are great when they work, but there has to be an alternative (other than contacting APC) when they don't work. I guess that anyone or any company can make a mistake, but I would hope that this issue will be fixed as well. I really don't want to have to go through this again when the next computer gremlin strikes."*

## watchdog@acpmagazines.com.au

Has an IT vendor or telco stuffed you around? Let us know about it and we'll chase them for a solution on your behalf. Letters sent to watchdog@acpmagazines.com.au must include the writer's full name, street address, suburb, state and phone number to be considered for print publication (please also include details such as invoice numbers and people you've spoken to). Address and phone details will not be published. All correspondence becomes the property of APC and is subject to editing.




# Linux fans **hit back!**

**Complaints by Windows users sampling Linux have brought some sharp responses from Linux users.**

In response to Peter Anderson's letter (*APC* January, page 24), you cannot rationally expect applications that have been designed and developed with one platform and one platform only in mind to 'just work' when you switch to a different platform, and, when they don't, simply pack your bags and go home. Sure, you can't run iTunes or Paint Shop Pro or Premiere Elements on Linux (unless you use WINE), but often you won't need to. Take a look at the alternative applications available before you dismiss Linux. Instead of iTunes, why not use Banshee? Instead of Paint Shop Pro, try the GIMP or Krita. For web browsing and Outlook-style functions, Firefox and Evolution have you covered.

Firewall solutions such as ZoneAlarm are also less neccessary, as the constant updating, strict user accounts and reduced buffer overruns make Linux significantly less vulnerable to damaging attacks, but, even so, Novell's SUSE distribution has technologies such as AppArmor and SUSEFirewall that leave it virtually airtight.

***Liam O'Connor-Davis***
***Padstow, NSW***

## USE VMWARE FOR LINUX

I am writing to point out to Mr Mike Le Voi (*APC* February, page 24 )that Virtual PC is designed specifically for legacy Windows operating systems — that's why it won't run Linux. If you want to try Linux in a virtual environment then I would recommend VMware. Made by an independent company, it's actually designed to support Linux. Ubuntu and many other distros also have live CD versions which you can mess around with. With a little bit of know-how you can even install a distro to a memory-stick, leaving Windows intact and unchanged.

***Jake Schoermer***
***Brisbane, Qld***

## WINDOWS CONDITIONING

In response to Mike Le Voi's letter, don't bash Windows or Linux for bad hardware — bash the vendors of the hardware. True hardware support only comes from vendors who do the right thing and release drivers or specifications to create drivers to both communities. I also think that many years of Windows conditioning have led people to want things to work the Windows way. If you really want to learn to use Linux, install it and use it. Seven hours of Linux versus five years of Windows is hardly a fair comparison. Does anyone remember Windows DLL hell?

***Nigel Marshall***
***Forest Lake, Qld***

## STICK WITH WINDOWS

For those Windows lovers thinking of dual-booting with Linux, why bother? You already know it's not for you. If you hate using Windows give Linux a go and give your brain and attitudes a treat — it can do no harm.

If you don't like it, throw the stupid thing away and buy a Mac. If you don't like the Mac, give it to a kid with glasses and go outside: you could meet a human who has a real life.

But honestly, dual-booting is like trying to live with Rachel when you want to be with Jane.

***Kevin Sargent,***
***South Canterbury, NZ***

## WIN 98 OUTSHINES LINUX

A couple of years ago, I gave Linux a try but was unable to get it installed. After reading your articles recently, I thought I'd try again. My needs are modest, so I found an old Pentium 3 and upped the memory. I decided that if I could do basic audio editing, play MP3 files, Windows programs, but you can find replacement programs. It takes time and effort to learn what the replacements are and how they are different but the freedom and power that is placed back in your hands is worthwhile.

***Harry Phillips***
***Mango Hill, Qld***

# letter of the **month**

## JUST TYPICAL

**Peter Anderson's letter on being tempted by Linux but preferring Windows is a typical reaction of a Windows user. They hear that they can run Linux instead of Windows and they think it is a replacement for Windows.**

**Here is some advice to others considering the switch to Linux: you can't run (most of) your favourite**

Harry wins this issue's Letter of the Month prize, a Logitech Cordless Wave Desktop keyboard and mouse set valued at $179.95.






**"Polly want a platter?" Yet another use for dead disks.**

browse the web and use email, I'd keep the installation.

I tried five different distros, but none managed to work properly. Two failed to give me any sound. One downloaded the MP3 codec but then declared a software conflict. SUSE, which looked very promising at first, refused to download a codec, insisting there was no internet connection even though Firefox was happily browsing the web. Mandriva came closest to working, happily playing MP3s, but wouldn't give me a screen resolution above 1,024 x 768, and the email wouldn't work.

So it's back to Windows 98 for the old machine, which is now happily performing the tasks I set it. Perhaps in a few years, some version of Linux may emerge which will perform as well as Windows 98. We'll see.

***Chris Grealy***
***Capalaba, Qld***

## REVENUE RAISERS

I'm responding to the letters in the February *APC* regarding advertising on the internet, especially the Letter of the Month which erroneously compared ads on web sites to email-based spam or the many printed catalogues that get jammed in our letter boxes every week.

Your correspondent seems to be blissfully unaware that running a web site costs money and that many sites would not be able to exist without the revenue they receive from ads.

Every time you or I go to a web site it adds to the bandwidth bill for the owner. If everyone blocked all ads then sites such as Penny Arcade, Slashdot or even Google would not be able to continue. The only informative or entertaining sites left would require people to subscribe or pay for access. Is this really what you want?

***Mat Ward***
***Point Cook, Vic***

## STUDENTS CRITICISED

I was disgusted with what Glen Washburn (*APC* January, page 22) had to say about us students. I am, of course, still a high school student that is a self-confessed geek, and I have to access the internet under the toughest filter you will ever see.

At school, you can visit any sites on the white list. The rest are blocked as 'unclassified'. The massive problem is you can pretty much not go anywhere! My friends and I started a little fun and help forum for homework, but it was blocked. People who needed help from the site could not access it from school. Is it really that hard for the department to tone the filter down a bit so we can use sites other then Wikipedia?

I really think that adults should *really* stop stereotyping this and that. Is stereotyping any good to anyone at all? No. You just end up with discrimination. I hope my message will finally get to people for once.

***Lawrence Wong***
***Eastwood, NSW***

## DESTROYING DRIVES

Having read many stories about the disposal of hard drives and the fact that they can be restored no matter how you format them, I came into possession of four computers, all with hard drives intact. Two had 160GB hard drives which I would re-use; the other two had 10GB hard drives that I would dispose of.

I figured using an axe on them was slight overkill, while pyrotechnics and other forms of munitions were probably illegal in my council area (and the neighbours would object to the noise). So, as you can see from the enclosed photos (above), I used the platters as toys for my birds, and they love them.

***Bennett Smith***
***Burton Park, SA***

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# This month in Labs. . .

# Ultra-probable

Since late last year there's been a huge increase in interest around ultra-portable notebooks. The ASUS Eee PC started it all off: a sub-1kg, sub-$500 tiny subnotebook sold through retail that convinced a load of people to snap it up to essentially use it as a plaything. For such a low cost, a tiny piece of computing power with a real keyboard can be thrown in a backpack or briefcase to use whenever it comes in handy — either for a bit of impromptu web surfing, making some notes or peering at a 7in screen for some movie playback. Out of the box, the Eee PC runs Linux.

Since then, we've seen a release from Pioneer Computers in a similar price range, at just over 1kg with a 7in screen (and a few more bits and bobs). This little notebook, dubbed the IL1, strikes me as a bit more practical, with the larger hard disk. It also runs Vista, if you've a mind to.

The biggest news in the ultra-portable space was the MacBook Air — Jobs' latest aluminium geegaw uses a bigger 13.3in screen, a full-size keyboard and industrial-grade bank-account-draining technology. Feedback from those who have tinkled its keys have been quite mixed, but most agree that compromises in functionality to fit its form factor limit its usefulness. Mac afficionados have a consensus that these compromises aren't such a bad thing, as it's not meant to be a desktop (or notebook) replacement. The stunningly high price point is another thing to consider before purchasing one.

These three ultra-portables have something in common — they're all secondary computing devices. Nobody will give up their PC for an Eee PC or IL1, or their MacBook Pro tor a MacBook Air — these machines are basically advanced versions of a notepad and pen: mostly good for pulling out when you need to jot something down, get a bit of work done on the train or keep yourself entertained for a brief period of time. I can see these types of subnotebooks and ultra-portables filling the on-the-go information needs that mobile phones and PDAs never really did. They're big enough to surf the web but small enough to lug around.

And from $500, the dent in the wallet isn't too drastic.

To me, these devices represent a new usage model for computing. No doubt the seeds of a new genre of software, for both productivity and entertainment on the move. But, you know — this time, actually useable. EDIT



> TO ME, THESE DEVICES REPRESENT A NEW USAGE MODEL FOR COMPUTING. BUT, YOU KNOW – THIS TIME, ACTUALLY USEABLE.

Geek

NICK RACE – TECHNICAL EDITOR




# MSI HD 3870 X2 OC edition

## Double the fun and faster than stock.

| | |
|---|---|
| CONTACT | MSI |
| ONLINE | www.msicomputer.com.au |
| MARKET | Performance enthusiasts |
| PRICE | $699 |

✔ High-res performance.

VERDICT ★★★★☆

✖ Expensive.

As the first quarter of 2008 ends, it's clear we're looking at the year of the graphics card. Nvidia has recently announced the 8800GS, with the 9600GT and 9800GX2 just around the corner. Meanwhile, AMD isn't sitting back; the HD 3450 and HD 3650 are due, which will bring a new range of low-to mid-level cards and the HD 3870 X2 has just been released as well.

The HD 3870 X2 is what we're looking at here, and the name really does say it all. It's a single graphics card that carries two HD 3870 GPUs. The new card doesn't replace anything; it expands upon AMD's already competitive HD 3800 series.

In the technical department, this card is full-on; 1GB of GDDR3, two HD 3870 cores on a single PCB, up to four Dual-Link DVI connectors, PCI Express 2.0 and Direct X 10.1 are the main features. Transistors are way up from 666 million to 1.3 billion, stream processors are doubled to 640 and Texture Units/Render back ends are both doubled to 32.

The core speed has been increased from the default 775MHz that we see on the standard HD 3870 to 825MHz. Memory on the other hand has slightly dropped due to AMD moving back to GDDR3 on the X2. We now come in at 1,800MHz DDR versus the HD 3870, which carries with it a clockspeed of 2,250MHz on its GDDR4 memory.

While a few years ago ATI slowed down companies releasing pre-overclocked cards straight away, that attitude has been dropped since the AMD take-over, and we have seen companies like ASUS, MSI and GeCube all offer pre-overclocked cards on release day.

The MSI model we have here is the pre-overclocked OC edition of the card. It gets bumped up to 850MHz on the core while the memory carries with it the same 1,800MHz DDR clock.

It's all well and good increasing clockspeeds along with the addition of an extra core and double the memory, but ultimately it's the performance that talks. What does the HD 3870 X2 say? ("I'm here to run your games at max. settings!")

The card performs well in the right situation. Using CrossFire technology to link the cores together means that if a game doesn't have the ability to make use of multiple GPUs then performance doesn't go anywhere. On the other hand, if it can make use of the technology then performance lifts and it walks over anything Nvidia has to offer at the moment.

The new CrossFire X driver is due out in March, which will see the ability to place two HD 3870 X2 cards together and get the power of four GPUs. Performance is a case of hit and miss, but that's to be expected with any dual-GPU setup unfortunately.

Monthly driver updates from AMD and a good support system should mean that we see improvements with the model as the weeks go by. If you've got a big monitor and you're thinking of going quad-GPU in the near future, we would *highly* recommend the HD 3870 X2. On the other hand, if you're just after a good single GPU card and the budget is a bit tighter, we would continue to recommend the highly popular 8800GT from Nvidia.

***Shane Baxtor***

### PERFOMANCE TEST RESULTS

| | Crysis 1,680 x 1,050 | Crysis 1,920 x 1,200 | Company of Heroes 1,680 x 1,050 | Company of Heroes 1,920 x 1,200 |
|---|---|---|---|---|
| ASUS EN8800GT 512MB | 50.1 | 42.4 | 42 | 40.7 |
| BFG Tech 8800GTX OC2 768MB | 52.87 | 45.37 | 45.2 | 30.6 |
| GeCube HD 3870 X-Turbo III | 48.11 | 40.57 | 52.1 | 42.5 |
| ASUS 8800GTS (G92) 512MB | 57.33 | 47.97 | 51.3 | 43.3 |
| MSI HD 3870 X2 OC 512MB | 60.31 | 48.66 | 54.3 | 51.7 |

Crysis – All settings at medium. Company of Heroes - All settings at high.

### NEW BLU-RAY SPEC

No sooner has Blu-ray triumphed in the format war than vendors are adopting new specifications of the format. Panasonic's DMP-BD30 Blu-ray disc player is one of the first to adopt the BD Profile 1.1 standard. This allows new functions such as Picture-in-Picture and Audio Mixing. $899.

***www.panasonic.com.au***



### FLICKER-FREE GERMAN

Loewe of Germany has released a 100Hz high-definition LCD HDTV set, the Xelos A 32 HD+ 100. The 100Hz essentially doubles the image frequency and reduces flicker on the LCD TV, particularly in sport. $3,999

***www.internationaldynamics.com.au***



### THE PEOPLE'S PLAYER

Despite the traditional premium positioning of Apple's products Steve Jobs clearly wants to own every market segment with the iPod. Apple's iPod shuffle is now $65, with a new 2GB model costing $89.

***www.apple.com/au***



# Intel Dual-Socket Extreme desktop platform 'Skulltrail'

## Has desktop supercomputing arrived with Intel's dual-socket, eight-core Skulltrail platform?

When Intel revealed its original dual-socket, eight-core desktop platform last year it looked like a knee-jerk reaction to AMD's similar Quad FX technology. Known as the V8 platform, it was little more than a collection of hastily thrown-together Xeon workstation components. Both the quad-core 65nm Xeon processors and 5000X motherboard that formed the basis of the V8 were essentially off-the-shelf hardware, albeit the very finest Intel could offer.

Enter Intel's second-generation dual-socket desktop offering, the ominous-sounding Skulltrail platform. Intended to be a crushing display of technical superiority, Skulltrail, like V8, is closely related to Intel's existing Xeon workstation and server products. But, along with an upgrade to the latest CPUs and chipset, Intel has taken the time to polish Skulltrail into a much more convincing platform for desktop computing enthusiasts.

### HIGH-CLASS CHIPS

Heading up the astonishing component list are a pair of 45nm Penryn family quad-core processors running at a screaming 3.2GHz and each boasting no less than 12MB of L2 cache memory. This time around, Intel has branded the chips with more familiar desktop nomenclature to create the Core 2 Extreme QX9775. The QX9775 is the only Core 2 CPU model available at launch for the Skulltrail platform. Intel won't be drawn on its plans for releasing faster — or for that matter slower and cheaper — Core 2 chips for the Skulltrail platform.

However, thanks to Intel's decision to use a conventional LGA771 Xeon processor socket, the QX9775 isn't the only option available to you. Any LGA771 Xeon DP processor is supported, including the likes of Intel's high efficiency Xeon chips — a fact that is highly relevant given the power consumption implications of running two quad-core CPUs in a desktop system. Specified with a pair of QX9775 processors, Skulltrail has a minimum power supply requirement of 1,000W.

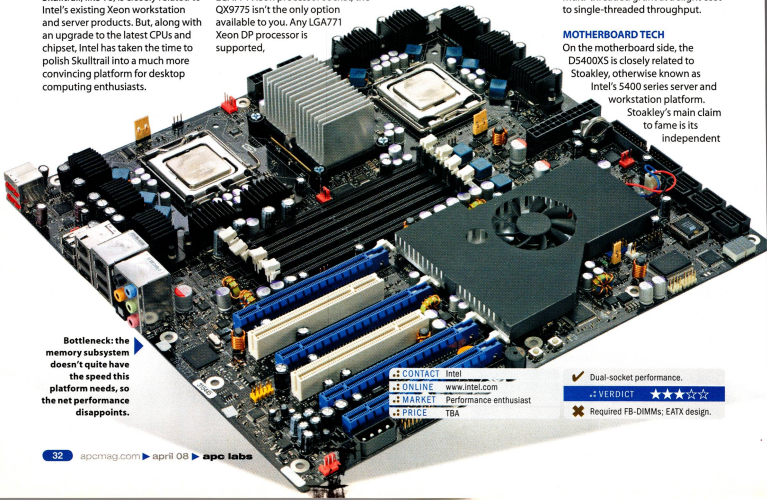
Factor in its theoretical support for four graphics chips rendering in parallel (more on that in a moment) and the minimum requirement balloons to 1,400W. It's also worth noting that mixing and matching of processor models isn't possible: both chips must be identical.

On paper, there's very little difference between this new CPU and Intel's previously announced Core 2 Extreme QX9770 processor. It's architecturally identical right down to the 45nm silicon production technology, dual-die/quad-core configuration, 3.2GHz clockspeed, 1,600MHz bus and 12MB L2 cache. Both chips also share an unlocked CPU multiplier for simple overclocking. Indeed, the 4GHz this chip typically achieves is identical, too.

Of course, in terms of raw circuitry, Xeon and Core 2 processors are based on the same CPU dies. But it's the equivalent Xeon platform, rather than Core 2, that should guide expectations in terms of performance. Which means great multi-threaded grunt at a slight cost to single-threaded throughput.

### MOTHERBOARD TECH

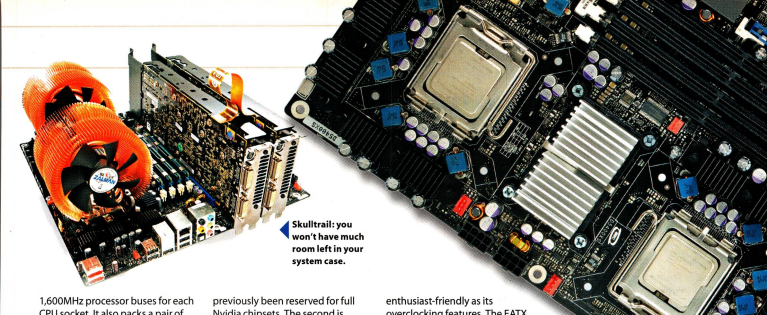
On the motherboard side, the D5400XS is closely related to Stoakley, otherwise known as Intel's 5400 series server and workstation platform. Stoakley's main claim to fame is its independent



**Bottleneck: the memory subsystem doesn't quite have the speed this platform needs, so the net performance disappoints.**

CONTACT Intel
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MARKET Performance enthusiast
PRICE TBA

✔ Dual-socket performance.
VERDICT ★★★☆☆
✖ Required FB-DIMMs; EATX design.



**Skulltrail: you won't have much room left in your system case.**

1,600MHz processor buses for each CPU socket. It also packs a pair of memory controllers and a total of four memory channels organised into two branches. Both of these measures are designed to increase the data bandwidth available to the CPUs, traditionally a weakness of Intel's Northbridge chip-based bus and memory controller. In theory, Intel claims, each branch in this system provides a beefy 12.8GB/s of memory bandwidth.

What's more, the Seaburg Northbridge chip that powers Stoakley also has a number of further enhancements to improve data throughput. Most notable is an enhanced snoop filter that reduces unnecessary cache coherency updates. The result is reduced bus traffic, fewer processor cycles lost waiting for data to arrive and more efficient performance scaling.

Impressive as all that sounds, it could actually be better. Thanks to the Xeon-derived chipset, Skulltrail's memory support is capped at 800MHz DDR2 in contrast with the 1,333MHz DDR3 capability of its best desktop chipset. What's more, it also requires fully buffered (FB) memory DIMMs, and they don't come cheap.

## QUAD SLI SUPPORT

The pros and cons of Stoakley aside, there are a number of important areas where Skulltrail differs from a conventional 5400 series motherboard. The really big change is the addition of a pair of Nvidia nForce 100 MCP PCI Express bridge chips. On the downside, that means a downgrade from the standard PCI Express 2.0 support of the 5400 chipset to the slower PCI Express 1.1 interconnect specification. However, the twin MCP chips deliver two important features.

The first is support for Nvidia's SLI multi-card 3D graphics technology, a capability that has previously been reserved for full Nvidia chipsets. The second is enough PCI Express lanes to support no less than four PCI-E graphics ports, each with 16 lanes. In turn, that means Skulltrail has the gumption to support four video cards in quad-SLI mode. For now, it's a theoretical feature. Nvidia has not released a driver that supports more than three cards in SLI mode.

Just as important for enthusiasts are the overclocking features Intel has added. Most obviously, the QX9775 processors receive unlocked CPU multipliers. That allows for increased frequencies without stressing the motherboard chipset or memory DIMMs. But if Skulltrail does have a weakness, it's the data bandwidth to those cores. Intel has therefore kitted out the D5400XS's enthusiast-friendly as its overclocking features. The EATX form factor of the D5400XS motherboard is much deeper than a standard ATX motherboard, so it won't fit in most desktop cases.

Nevertheless, with the right case and PSU, Skulltrail certainly adds up to a mountainous machine for desktop computing. With eight 3.2GHz processor cores, 24MB of cache memory and perhaps as many as four GPUs, on paper Skulltrail packs as much power as the fastest early 1990s supercomputers.

How does it perform? The key question, in other words, is whether today's applications are capable of taking advantage of eight CPU cores. With the debate that still rages over the merits of quad-core processors, are our desktops really ready for eight-core computing?

**Count those cores: paired processors mean plenty of power is packed in.**

generate the full complement of eight software threads, whether single- or multi-threaded, Skulltrail is much less impressive. As far as we're aware, for instance, there isn't a single PC game that can spread itself over eight cores. Even high-tech titles that scale very well on quad-core processors — the likes of Half-Life 2 and Crysis — derive no benefit at all from a total of eight cores.

Ultimately, Skulltrail's prohibitive

> BOTH CPUS MUST RUN AT THE SAME SPEED. THE MAXIMUM OVERCLOCK MUST BE DEFINED BY THE WEAKER OF THE TWO CHIPS

BIOS with a wide range of overclocking options.

## CUSTOMISATION LIMITS

Both frequencies and voltages for the Northbridge and memory are fully adjustable. It's also possible to fine-tune memory latency thanks to a full set of timing options. In short, it's every bit as tweakable as a conventional Intel desktop board based on chipsets such the P35 and X48. The only slight downside is the need for both CPUs to run at the same speed. Consequently, the maximum overclock must be defined by the weaker of the two chips. That said, independent voltage adjustments are available for each CPU. Unfortunately, however, Skulltrail's physical properties are not quite as pricing is impossible to ignore. The two CPUs, motherboard and memory alone will set you back well over $3,000. Even for those who aren't worried by that terrifying figure, the fact that Skulltrail doesn't deliver total performance dominance should be enough to make them think twice.

The simple answer is that it depends on the application. The raw performance of the platform is amply demonstrated by synthetic tests such as SiSoft Sandra, where Skulltrail is very nearly twice as speedy as the fastest single-socket desktop processor, the Core 2 Extreme QX9770 3.2GHz chip. Likewise, applications capable of generating fully eight CPU-intensive software threads absolutely fly. Both our X.264 video encoding and Cinebench 3D rendering benchmarks run over 50 per cent faster on Skulltrail than on a system based on a single QX9770 CPU.

## FUN AND GAMES?

However, when it comes to programs that are unable to

Finally, here's something for Intel to consider regarding an alternative route to extreme desktop performance. Given the enormous overclocking headroom of the latest 45nm Core 2 processors, it's abundantly obvious that a low volume 4GHz model is possible. Wouldn't that be a simpler, more realistically priced solution with more consistent performance? It's a thought...

***Jeremy Laird***

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### NEC DOES TVS

NEC Australia is starting to push HDTVs, but showing its monitor heritage, NEC's two new 1080p LCD HDTVs, the 40in NLT-40FHD100 and 46in NLT-46FHD100 come with an RS-232 connection that allows them to be controlled from a PC. Price: $2,799 and $3,499 respectively.

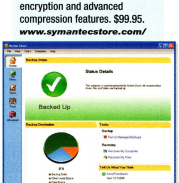
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### A NEW GHOST!

The new Norton Ghost 14 can back up and restore a user's entire PC, including all of its data, applications, settings, folders and files, and offers remote backup management, encryption and advanced compression features. $99.95.

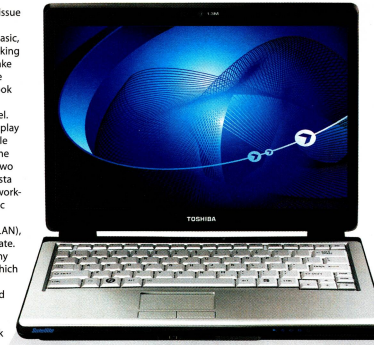
***www.symantecstore.com/***




# Toshiba Satellite U300




## All work and no play doesn't describe Toshiba's latest.




Think of a standard work-issue notebook, and you'll probably imagine something basic, bulky, and more functional-looking than funky. Toshiba is set to shake things up with the new Satellite U300: a feature-packed notebook that's built for business but designed like a consumer model.

The line between work and play usually gets blurred once mobile devices enter the picture, but the U300 transitions between the two like a pro. Running Windows Vista Business (and with a bunch of work-friendly features like a biometric fingerprint scanner, Gigabit Ethernet and 802.11a/b/g/n WLAN), its focus is obviously on corporate. However, features like the roomy 250GB hard drive (the size of which is better suited for the latest episodes of Grey's Anatomy and Entourage than a handful of documents and email), dedicated multimedia playback keys and a 1.3-megapixel webcam make the U300 an able companion for after-hours use.

It's also a seriously sexy machine, whether you're comparing it to other boardroom beauties or the trendy notebooks at your local coffee shop. The glossy onyx blue lid (which looks black in most lighting) with its curved edges and rounded corners is striking, as is the glowing blue Satellite logo and power/activity LEDs on the notebook's edge. Pop the lid open and you're greeted by a silver keyboard area and a 13.3in wide-screen 1,280 x 800 TruBrite display. It's a slickly-presented package that's stylish yet unpretentious, with a solid build quality that makes it more than capable of surviving the rigours of the road.

Weighing in at 2kg, the U300 is a borderline ultra-portable if you're looking at weight alone, but it's relatively thick at 3cm. Still, the 13.3in screen makes it more compact than the standard-sized 14 and 15in laptops, and it doesn't sacrifice on performance or have a cramped keyboard like an ultra-portable would. The U300 runs a 2.2GHz Intel Core 2 Duo T7500 processor with 2GB of RAM (expandable to 4GB), and while the Intel GMA X3100 graphics won't see you playing Crysis any time soon (reflected in its 3DMark06 score of 542), it's a zippy little machine that does well for multi-tasking. With the PCMark05 benchmark, it scored 4,823 — well above average for a notebook in this weight class, but you can probably do better once you clear out all the extra software that comes pre-loaded.

We're pleased to see three USB 2.0 ports on the U300, where two is usually the standard for smaller notebooks. Other ports and connectors include a PCI Express Card, five-in-one memory card reader, FireWire, VGA, Gigabit Ethernet, modem and a DVD SuperMulti Double/Dual Layer Drive. It also has a biometric fingerprint scanner nestled between the two mouse buttons, 802.11a/b/g/n WLAN (with a handy wireless switch on the front of the notebook) and Bluetooth 2.0 + EDR. Emphasising its business focus is the lack of S-Video or HDMI ports on-board, and the stereo speakers are of the usual notebook variety: weak, tinny and lacking in bass.

With our DVD run-down test, we were able to get just under three hours of battery life from the standard 5200mAh Li-ion cell before the system shut down. This is a decent result for a standard-sized notebook, but, for something closer to an ultra-portable, we would've expected a little more juice. Then again, most ultra-portables don't have the same processing muscle of the U300, so it depends on whether run-time or performance is higher on your list of priorities. As it is, we think the U300 strikes a good balance between power and portability if you don't want to compromise too much on either front, and it's reasonably priced for what it offers.

***Jenneth Orantia***

| | |
|---|---|
| CONTACT | Toshiba |
| ONLINE | www.isd.toshiba.com.au |
| MARKET | Everyone |
| PRICE | $2,199 |

✔ Stylish; compact; affordable.

VERDICT ★★★★☆

✖ Integrated graphics; no S-Video.

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### BLU-RAY SOUNDS

Vendors are rushing out accessories for Blu-ray. Pioneer Electronics Australia's HTP-LX70 Full-HD surround sound package for Blu-ray players features 3-dimensional dodecahedron speakers which emit sound in 12 different directions. $2,999

***www.pioneer.com.au***



### PASS THE ENVELOPE

Soon after the Macbook Air arrived in a manila envelope, Lenovo announced the 7mm thick ThinkPad X300, with a 13.3in LED backlight display, a 1.8in 64GB solid state drive, and connectivity options for WWAN, WLAN and Ethernet. $3,999

***www.lenovo.com.au***



### AFFORDABLE ROUTER

The Linksys WRT100 RangePlus Wireless Router is an affordable router with a built-in 4-port full-duplex 10/100 Switch and a range-enhanced wireless access point, suited for high-speed transfers of files, applications, and data from other peripheral devices. $129.95

***www-au.linksys.com***



# MSI MegaBook PR400x

## This entry-level notebook suits business users foremost.



White used to be the new black as far as laptops went, but now that blacks and dark greys are firmly back in fashion, white has been relegated to being rather passé — kind of like last year's iPod. Still, the MegaBook PR400x is attractive for an entry-level notebook, with its pearl-white finish, silver accents and ivory-white keyboard, and it boasts decent specs for its price tag.

A footprint of 332 x 240 x 35mm and travel weight of 2.2kg makes the PR400x more of a stay-in-the-office laptop than a traveller's machine, but as a portable workstation it's more than capable of handling regular office tasks. The 2GHz Intel Core 2 Duo T7250 processor is typical for a machine in this price range, and, helped along with a healthy 2GB of RAM, it pulled in a PCMark05 score of 3,569 — not spectacular, but if your main concerns are web browsing, email and word processing, it's got more than enough firepower to satisfy your needs. Our only concern on the work front is the clacky keyboard, which, while full-sized, doesn't have enough spring, resulting in too much noise when typing.

Our test unit came with Windows Vista Premium installed, but the PR400x seems better-suited as a business notebook. Multimedia keys (a staple of consumer-focused notebooks) have been omitted in favour of a biometric fingerprint sensor, and the smallish 160GB hard drive and integrated Intel graphics make it ill-suited for storing lots of multimedia or playing games (unless you're more into Scrabulous than Call of Duty). Also, the 14.1in screen (with a 1,280 x 800 pixel resolution) isn't as sharp as we'd like, with limited viewing angles and colours that lack vibrancy.

| | |
|---|---|
| CONTACT | MSI |
| ONLINE | www.msicomputer.com.au |
| MARKET | Everyone |
| PRICE | From $1500 |

✔ Affordable; well-rounded features.

VERDICT ★★★☆☆

✖ Mediocre display; noisy keyboard.

For a notebook of this size, at least four USB 2.0 ports are the norm, so we were disappointed to only find three on the PR400x. That aside, there's a good assortment of ports on-board, with VGA, S-Video, USB 2.0, modem and Gigabit Ethernet along the left, a five-in-one memory card reader, microphone and headphone jacks and an infra-red receiver on the front, and a PC Card slot, mini-FireWire, two USB 2.0 ports, Gigabit Ethernet and a Kensington lock slot on the right.

The back of the notebook houses the power connector and a large port replicator jack — an unusual choice give than most vendors place the latter on the bottom of the notebook — and a 1.3-megapixel webcam sits above the display. Other notebook accoutrements include the DVD Super Multi optical drive, 802.11a/b/g/n WLAN and Bluetooth 2.0 + EDR.

Using our DVD run-down test (where we loop a DVD to find the minimum battery life in real-world usage), the MegaBook operated for two hours and 20 minutes before the 6-cell battery ran out of juice — a result that's about average for this class of notebook. Machines at this value end of the market also don't tend to come with much extra software pre-loaded, and the PR400x follows convention with only a trial version of Norton Internet Security and Protector Suite QL (which works with the biometric fingerprint scanner). We're actually of the less-is-more school when it comes to 'value add' software, as we've found that an over-abundance of applications and extra utilities take a toll on performance out of the box — especially when running Vista.

The PR400x is an affordable, decently-specced notebook that offers no more or less than what you pay for it. We wouldn't recommend it for home users due to the small hard drive and mediocre display, but corporate users that are looking for a value-priced machine that occasionally makes the journey home for after-hours work will find lots to like in MSI's offering.

***Jenneth Orantia***




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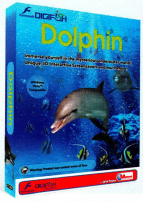
LG

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### A BETTER FISHTANK

Fishtank screensavers also get updated. The DigiFish Dolphin screensaver generates a photorealistic ocean environment that beats a real fish tank because it can feature dolphins. $29.95

***www.manac.com.au/***




### LIGHT SPEED

Stream large amounts of data at the speed of light – literally — with Netgear's PF101 Plastic Optical Fibre Ethernet Adapter. Just run the optical cable, cut to length and plug in. It's ideal for distributing high definition TV from a router to a set-top box. $259

***www.netgear.com.au***




### MOBILE SEARCH

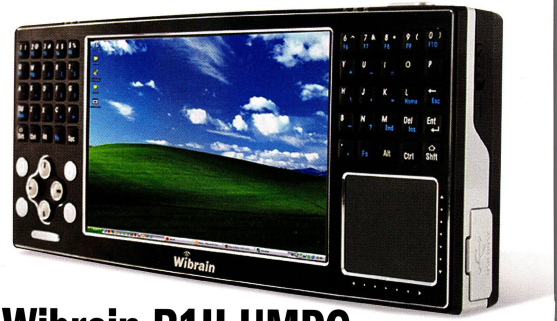
Google has released a new search service for mobile phones that is now even faster because it combines search results from mobile and regular web searches. It also remembers a user's recent search locations.

***www.google.com.au/m.***

Google

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» **More than web pages!** Google automatically searches images, businesses, news and more.




# Wibrain B1H UMPC

## Size matters, but so does functionality.

- CONTACT Tegatech
- ONLINE www.wibrain.com
- MARKET SMB
- PRICE $1,399

✔ Nice keyboard.

VERDICT ★★★☆☆

✖ Chunky; heavy.

The Ultra-Mobile PC (or UMPC) form factor was developed by Microsoft. Over the last year or so a number of different companies have endeavoured to design hardware that is portable but still allows users to have a complete operating system. The Korean-made Wibrain packs plenty into its 526g, albeit chunky, casing.

The Wibrain is designed for two-handed operation. The QWERTY keyboard is split, with half the keys on either side of the 4.8in, 1,024 x 600 display. Although the keys are small, we were able to achieve a reasonable typing speed using just our thumbs. The touchpad, on the right side, is well-placed for moving the mouse pointer. There are left and right mouse buttons to the left of the screen. The display is a touchscreen, so you can use a fingertip or stylus to click on icons and select text. One annoyance was the lack of a dedicated Windows key. This provides access to a number of useful keyboard shortcuts that users of this device will miss out on.

The Wibrain B1H, as tested, shipped with Windows XP Home Edition. Ordinarily, a new device without a current OS would draw criticism but, given Vista's higher hardware requirements, XP is a good choice. The CPU, a VIA C7M ULV 1.2GHz is designed for power efficiency as well as processing grunt. Via boasts their powerplant delivers the best x86 performance per watt in the industry.

We found the Wibrain B1 to be responsive, with it taking only a few seconds to launch Office 2007 applications. We didn't experience any significant system slowdowns and the 1GB of DDR2 memory was adequate. The 60GB 4,200rpm hard drive is at the lower end of the performance spectrum, but it's a necessary compromise for the Wibrain to remain as thin as possible.

Connectivity is covered off with 802.11b/g Wi-Fi and Bluetooth 2.0+EDR. The next release, the Wibrain B2, will include HSDPA as well that won't be locked to any particular carrier, according to Hugo Ortega, the Australian distributor. There's a single USB port for connecting USB peripherals. However, its placement on the right side of the device makes the device hard to use. We connected a USB memory stick and this made it difficult to use the trackpad.

Battery life, powered by a four-cell, Li-Ion was solid. Real-world testing, with Wi-Fi active, was in excess of 2.5 hours, although it should be possible to get through a significant portion of a day on the road by cranking power-saving settings up and letting the screen and hard drive power down when the unit's not in use.

If you're planning to use the Wibrain B1 in the office, you could connect a USB hub so you can use a mouse and keyboard. An external screen can be connected via the 24-pin proprietary connector on the Wibrain's lower edge using the supplied adaptor cable. Rounding out the package are 3.5mm jacks for a microphone and speakers, and a retractable VGA camera that flips up from the back of the device. The camera can be used for video chat or shooting photos. However, the camera only points to the front, so it's not easy to shoot photos if you plan to use the screen as a viewfinder.

The Wibrain B1 feels like a device that's almost right but is let down by a lack of detailed thought. The placement of the camera and USB port combined with the overall chunkiness makes it uncomfortable to use for extended periods. On the other hand, the ability to run a full operating system in a package that can be easily carried around might be compelling to some users.

***Anthony Caruana***




# Firebox X Edge X55e

## A powerful router and firewall for your SMB network.

| | |
|---|---|
| CONTACT | WatchGuard Technologies |
| ONLINE | www.watchguard.com |
| MARKET | SMB |
| PRICE | $1,630 |

✔ Solid; reliable; easy to configure.

VERDICT ★★★☆☆

✖ Three LAN ports; needs more power.

The WatchGuard Firebox X Edge e-Series of security appliances is made up of three major models: x10e, x20e and x55e. These models are designed to provide security in a small business network. The cheapest model, x10e, is designed mainly for smaller single-location businesses. It only supports up to 15 users. X20e can be used in larger branch offices. It supports up to 30 users. Finally, the x55e, which is the subject of this review, can be used in even larger environments. It doesn't come with a user limit. It's more powerful than x10e and x20e and more expensive. The two lesser models, however, are upgradeable to x55e.

The e-Series, like any other respectable Unified Threat Management (UTM) solution, supports additional online security subscriptions. These include a spam blocker, a gateway antivirus with an Intrusion Prevention System (IPS) and a web blocker with HTTPS URL filtering. Subscriptions come in 90-day or one-year blocks. If you decide to invest in a UTM device such as X55e you should consider investing in a security subscription. It's a good way to protect your network from viruses, trojans, spam and attacks.

The firewall throughput of x55e is 100Mbit/s while its VPN throughput is 35Mbit/s. The device has a serial port, two WAN ports, one OPT/DMZ port for an optional network and three LAN ports. According to WatchGuard's official data sheet, 10,000 concurrent sessions are supported by x55e as well as 25 VPN tunnels. X20e and X10e support 8,000 and 6,000 concurrent sessions and 15 and five branch office VPN tunnels respectively.

In terms of security x55e includes the obligatory Stateful Packet Inspection (SPI) firewall and the more interesting fragmented packet reassembly protection and protocol anomaly detection technologies. The proxy policy filters allow further monitoring and examination of HTTP, SMTP, POP3 and FTP connections. Network features such as policy-based routing, WAN failover, multi-WAN load sharing and balancing come as standard in x55e. In comparison, these features do not come as standard with x10e or x20e but can be acquired by upgrading to Edge Pro — WatchGuard's security appliance software.

Traffic management such as policy-based traffic and VPN traffic prioritisation is controllable in x55e. When it comes to VPN, apart from the standard 25 branch office tunnels, the system comes with 5 IPSec Client licences for mobile VPN. 55 Mobile VPN tunnels with SSL are possible. In terms of encryption DES, 3DES and AES are available to the user. For authentication IPSec via SHA-1, MD5, IKE and third party certificates are available. Encryption is thankfully done in hardware.

The system supports static and DHCP (server, client and relay) IP address assignment. Static and Dynamic NAT is supported, as well as IPSec NAT traversal. The device's logging and reporting features are satisfactory. There are two methods that can be employed to keep log files with Firebox X Edge. One is to use a WatchGuard Log Server — a component of the WatchGuard System Manager. Another is to use syslog — a log interface for UNIX.

We had no problems setting up and using X55e. Its web-based GUI interface was intuitive and simple to use. The system provides a lot of detailed information about its status ranging from memory and running processes to hostile sites, connection, VPN statistics and traffic prioritisation. The firewall was easy to configure and the Documentation was clear.

There are a few wizards available to the user for configuring WAN failover options, conducting setup of primary interfaces and defining policies for network traffic filtering. These are not going to be too useful for skilled network administrators, but they could help those of us with a little less experience.

WatchGuard's Firebox x55e is a solid router and firewall that stands up well with the competition. In some ways it's not as powerful as, for example, D-Link's DFL-260 (reviewed last issue, page 64) but it's still a very good device. Check it out the next time you go shopping.

***Peter Sbarski***

### SOUND FASHIONS

Plantronic's Voyager 855 is the first mono-to-stereo convertible Bluetooth headset for MP3 mobile phones. And fashionable to boot. Tune in full-spectrum stereo music and conveniently switch to calls on your music-enabled phone. $189

***www.plantronics.com***



### QUICK FOCUS

Sony Australia has expanded its line-up of digital single-lens reflex (DSLR) cameras with the 350, which includes a new quick auto focus feature and 2.7in variable angle LCD screen. The DSLRA350K DSLR model with a short zoom kit (with DT 18-70 F3.5-5.6 zoom lens) is $1,549.

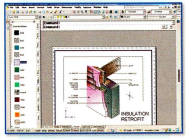
***www.sony.com.au***




### NEW AUTOCAD

The new AutoCAD 2009 package includes the first task-based user interface in a computer-aided design (CAD) application, as well as automation tools that don't need the user to have programming knowledge and new 3D navigational tools. Cost varies depending on licensing.

***www.autodesk.com.au***



### HD-DVD FIRE SALE

HD-DVDs are going cheap now that Blu-ray has triumphed. Microsoft has lowered the price of the Xbox 360 HD DVD Player from $249.95 to $129.95 in Australia and New Zealand.
***www.xbox.com/en-AU/***



### FAST GAMING

Netgear's WNHDEB111 HD 5GHz Wireless-N Networking Kit supports high-performance network gaming and will simultaneously stream multiple HD videos. 5GHz wireless means less interference. $349
***www.netgear.com.au***



### TRAVEL FAST

The 2.2kg HP Officejet H470b is claimed to be the world's fastest mobile printer, with speeds of up to 22 pages per minute (ppm) black and 18 ppm colour. $499
***www.hp.com.au***



# Nikon D300

## Nikon gets sensitive.




The D300 acknowledges past Nikon successes and doesn't stray too far.

In designing its DSLRs, Nikon has stuck with the tried and tested body design that is the hallmark of all its great cameras. The D300 is no different. With a great look and solid feel, you know you're getting your money's worth as soon as you pick it up. The now-standard rubberised grip makes the D300 a pleasure to hold, despite it weighing just under 1kg with attachments. The body is built to last, with a Magnesium Alloy shell that adds strength while reducing the weight.

The DSLR has been around long enough now that the basic design has become familiar to most users, so there have been no major attempts made to redesign the wheel. As you may expect from Nikon, the D300 has everything where it's supposed to be. The D300 acknowledges the functionality of its predecessors without trying to be radically different. Many of the camera's improvements can be found on the inside, although the larger 3in LCD with a 170-degree viewing angle is as impressive as it is sharp. An enlarged viewfinder with a 100% field of view has also been placed within the dust- and weather-proof body; the former offers a better (and more accurate) view of the subject, while the latter offers piece of mind whilst protecting your investment.

The D300 adds a new DX-format, 12-megapixel CMOS sensor to the multitude of features that made the D200 so popular. A new enhancement is the upgrading of the Group Dynamic AF mode of the D200 to the new 3D-tracking 51-point Dynamic Area AF mode. This feeds a low-res digitised version of the scene to a new Multi-Cam 3500DX AF module for tracking analysis, resulting in faster and more accurate focusing. Another popular new addition that has in recent years become a 'standard' inclusion is Live View mode. Where the D300's Live View stands out is its support and aiding of the autofocus. It is easier to use and far less complicated then expected.

One thing lacking in the D300 is in-body image stabilisation. Nikon relies on countering camera shake via technology within the lenses; luckily they give you the choice of two lens types with this model. We recommend the VR series of lenses for its image stabilisation compatibility.

One thing Nikon was especially proud of at the launch was the increase in ISO settings that it has achieved with the D300, as well as the D3. The ability to shoot up to the equivalent of ISO 6400 was touted as a landmark moment in digital imaging. Cries of 'Film is dead!' and 'We are now approaching the image quality of medium-format cameras', was repeated throughout the day. I don't know if I'd say they have gone that far as yet, but the D300's sensitivity does open up a lot more options to the digital photographer. Less noise and richer colours in lower light is still an advantage — and can only be a good thing.

Rather than try to impress the public with a high number, Nikon resisted temptation and decided to keep the D300 at 12.3 megapixels. It has instead relied on its improvements in ISO sensitivity and the ability to shoot in 14-bit raw mode to entice the professionals. Good to see that it values substance over the much-hyped and over-rated megapixel count.

apc Highly Recommended

- CONTACT Nikon Australia
- ONLINE www.nikon.com.au
- MARKET Performance enthusiast
- PRICE $3,999 with 18-200mm lens

✔ High sensitivity and image quality.

VERDICT ★★★★☆

✖ Price.

Some standard features that were kept from the D200 include built-in wireless flash control; adjustable centre-weighted metering; and a shutter-speed range of 1/8,000 to 30 seconds.

The D300's shooting speed is neither especially fast nor slow, although it does outpace the D200 in a few areas. Nikon stats state that the D300 delivers a quick 5.8 frames per second for high-speed burst shooting, as well as excellent low-light focusing performance, which in itself promises to make capturing images in anything but the bright daylight easier.

As for photo quality, the D300 delivers great results. With the improved sensitivity comes a visibly superior noise profile than that of the D200. Photos look sharp, with excellent exposures, accurate colours, and broad tonal ranges.

The lack of in-body stabilisation is the only concern we have, but with the right lens this argument is rendered mute. The D300 beats many similarly priced competitors hands down. If you can afford the $2,900 price tag for the body only, we can recommend the D300 to anyone from enthusiastic beginners to lower-end professionals.

The D300 is on sale in two variations: body only, or as a kit with a Nikon 18-70mm f3.5-4.5 lens.

***Christopher Zammit***

SONY



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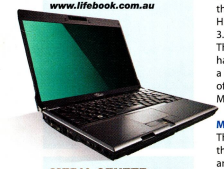
For further information
and dealer locations visit:
**www.newmagic.com.au**
or telephone: **(02) 9528 4555**

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### SAME SIZE BIGGER SCREEN

Fujitsu has squeezed a 12.1in widescreen display into its new 1.2kg LifeBook P8010, a notebook with same footprint as its predecessor, the LifeBook P7230,which could only accommodate a 10.6in display. $2,799

**www.lifebook.com.au**



### MEDIA CENTER TUNERS

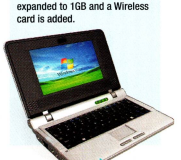
Compro VideoMate Vista TV tuners bundle Vista and MCE remote controls and MPEG-2 encoders. The E800F model has a real-time hardware MPEG-2 processor to generate high quality video with minimum CPU usage. The E800F is $205.

**www.anyware.com.au**




### UMPC FOR THE MASSES

It was inevitable that ASUS's EeePC would motivate other vendors to come up with competitive offerings. Pioneer has released the DreamBook Light IL1 which starts at $499 with a larger hard disk (40GB). But its cost quickly ramps up to $600+ once memory is expanded to 1GB and a Wireless card is added.



# Mediagate MG45 & MG450HD

## These players keep digital home theatre competition fresh.

South Korean-based company A.L.Tech has had its range of Mediagate portable media players on the market for quite some time, the most popular being the 2.5in HDD-based MG-25 series and the 3.5in HDD-based MG-35 range. Their next generation of players has hit the market, and we're taking a look at the two 3.5in HDD-based offerings — the MG-45 and the MG-450HD.

### MEDIAGATE MG-45

The MG-45 is a direct upgrade of the MG-35, and is identical in look and feel. It accepts only SATA hard drives, which can be formatted with either FAT32 or NTFS. The MG-45 doesn't make use of the NDAS technology (Network Direct Attached Storage) which was used in the MG-35, instead just using standard TCP/IP networking to connect to remote file shares on the local network.

The look and feel of the MG-45's navigation menu is completely unchanged from the MG-35. It's quite intuitive, but you do have to choose an operating mode — hard drive or networked — to direct the unit where to look for available media, and you then have to choose which media type. For example, if you're in Video mode and you navigate to a music folder, the unit won't see any files.

Media support is comprehensive: MPEG-1, 2, 4, MP4, MP@ML, M2V, DivX 3/4/5/6, AVI, XviD (without QPEL or GMC), DAT, ISO, DVD (IFO, VOB) for video, MP3 and Ogg Vorbis for audio and JPG, BMP, GIF and PNG for pictures. The unit has outputs for a variety of audio and video standards, including digital audio and HD component at 1080i.

The unit was very easy to set up and use. Network access on a local DHCP network via the 10/100 NIC was uncomplicated and the MG-45 was able to play back encoded movies across the network without any problems. However, it seriously struggled to play uncompressed DVD IFO/VOB files, as it was unable to cache the files fast enough, which resulted in stuttering and unwatchable playback.

### MEDIAGATE MG-450HD

The MG-450HD is a very similar unit to the MG-45, except that it's a true high-definition device, supporting resolutions up to and including 1080p, and with an HDMI output. The unit also acts as a USB host so that you can connect storage devices from which you can play content or copy it to the local disk.

The internal software and navigation system has been completely overhauled and is now far more slick and intuitive. Unlike the MG-45 you don't have to choose an access or a media mode — the MG-450HD can browse the network or the local disk easily and will play anything you tell it to.

The 10/100 wired network is enhanced with the addition of wireless connectivity. The unit comes with a 5dBi detachable antenna and 802.11b/g support (ad-hoc and infrastructure). The unit does a good job of navigating the local network and accessing shared file resources but, unfortunately, it suffers from the same problem when playing uncompressed DVD content as the MG-45, over both the wired and wireless networks. Considering the size of HD content, it seems strange that the manufacturers chose not to include Gigabit LAN.

Media support is also comprehensive: MS-MPEG-4, XviD (not with GMC), WMV9, MPEG-1/2, HD-MPEG-2 and SD-MPEG-2 for video, MP3, Ogg Vorbis, WAV and WMA for audio, and JPEG, PNG and BMP for pictures.

While both units are affordable and powerful, the MG-450HD is the stand-out. Not only is the revamped navigation a pleasure to use, but the unit itself can connect to Shoutcase and InLive internet radio. Additionally, its networking performance (although disappointing) is enhanced with SMB/NFS, uPnP and FTP client support. You can even set the unit up as an FTP server and upload content directly to the hard drive.

*James Bannan*




### MEDIAGATE MG-45

| | |
|---|---|
| CONTACT | Anyware Computer Accessories |
| ONLINE | www.anyware.com.au |
| MARKET | Everyone |
| PRICE | $199 |

✔ Wireless networking; features; HDMI.

VERDICT ★★★☆☆

✖ Design; network DVD performance.

### MEDIAGATE MG-450HD

| | |
|---|---|
| CONTACT | Anyware Computer Accessories |
| ONLINE | www.anyware.com.au |
| MARKET | Everyone |
| PRICE | $289 |

✔ HDMI output; support for Intel CPUs.

VERDICT ★★★★☆

✖ DVD perfomance disappointing.




# i-mate ULTIMATE 8502

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# What's New in SQL Server 2008

**Support for more data types and better manageability are some of the features of the new SQL Server 2008, writes *Dr Greg Low*.**

When SQL Server 2005 shipped, many seemed overwhelmed by the number of new and upgraded features in the product.

There was a famous PowerPoint slide where all the summary names of the key new features were listed. It was a full slide of eight-point text. Given the length of time since the previous release, it wasn't all that surprising.

The related slide for SQL Server 2008 is not yet at eight-point text, but it is already at ten-point. The upcoming version of SQL Server again pushes the boundaries of the product.

In particular, there's built-in support for data types not usually directly supported in relational database engines. The support of spatial data in particular is likely to push this technology into mainstream use in the industry, and the filestream data type provides an interesting blend of database and file system. The product looks to be far more manageable than previous offerings and is likely to move even more so into the enterprise space.

## PRODUCT DRIVERS

There have been several key driving forces behind this release of SQL Server. First, enterprises were demanding that their database engine store more than just simple text and numbers. XML support was introduced in SQL Server 2005, but this version provides support for a much richer set of data types.

Second, there is a shift in the form factors that the database engines need to support, both at the low-end and at the very high-end. The third driver is the increasing impact of regulatory compliance, and the final is the rate of increase in available storage technology.

It is interesting to note that many industry analysts have suggested that as much data has been stored by the industry in the last two or three years as was stored in its entire history prior to that. And the rate of data storage continues to increase.

Given the overall number of new and enhanced features in SQL Server 2008 product, only the highlights are able to be mentioned here.

## BEYOND RELATIONAL

Enterprises need support for a wide variety of data types beyond the traditional storage of text and numbers.

A near-religious level debate has existed in the industry for years about whether binary large object (BLOB) data should be stored in the database or out in the file system. There have been pros and cons in both approaches.

The new filestream data type in SQL 2008 provides an interesting blend of both. It allows the data to be stored in the operating system and accessed via Win32 streaming APIs while still maintaining transactional consistency and security via the database engine. The data can also be accessed at standard database speed via T-SQL statements.

It has become increasingly common for database models to require large numbers of columns, nearly all of which are NULL most of the time. Sparse column in SQL 2008 support has been designed to support this. If a column is declared as sparse, it occupies storage only if it contains data. Tables now support very large numbers of sparse columns. When the data is queried, along with standard query techniques, an efficient XML-based summary of all the sparse values in a row can be obtained.

To support such sparse data, the concept of a filtered index has been introduced. This allows different indexing strategies to be applied to different sections of a single table. As an example, the active part of a table could be indexed differently to an archive part. It also means that indexes built on sparse columns can be quite compact. In previous product versions, each index contained a leaf level entry for each row in the source table.

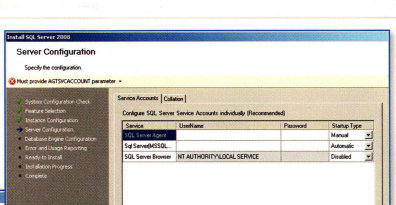
User-defined data types (UDT) and user-defined aggregates were limited to 8KB of static data in SQL Server 2005. This restriction has now been lifted and these types can now occupy up to 2GB.

Probably the biggest data type news however is the introduction of spatial data support. Both flat Earth (planar) and round Earth (geodetic) data types have been added as GEOMETRY and GEOGRAPHY, along with a host of OGC-compliant spatial methods such as STIntersects(), STUnion(), STPointOnSurface(), etc. As a true added bonus for .NET

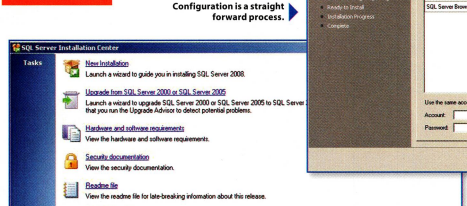
## ABOUT THE AUTHOR

**Dr Greg Low**
Dr Greg Low is the managing director of Solid Q Australia, a subsidiary of Solid Quality Mentors USA. He is a Microsoft MVP for SQL Server.
**www.sqldownunder.com**
**http://msmvps.com/greglow**






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## SEVERAL ENHANCEMENTS HAVE BEEN MADE TO ENSURE THAT SQL SERVER REMAINS AN ENTERPRISE-CLASS DATA PLATFORM

developers, Microsoft has provided the spatial function library as a separately installable assembly that can be built into standard .NET applications.

Several other enhancements have been made to ensure that SQL Server remains an enterprise-class data platform.

Customers were requesting a way to encrypt entire databases without the need to make application code changes. Transparent Data Encryption now encrypts the entire database, unlike the column-based encryption scheme introduced in SQL Server 2005. It also provides support for certificates. SQL Server now works better with external key management authorities.

Also critical for customers was the need to audit all actions occurring on the database engine, so a detailed data auditing system has been added.

An interesting addition is the support for hot-pluggable CPUs. Previous versions introduced the SQL Server OS abstraction layer, which allowed dynamic changes to other hardware such as memory. SQL Server now supports the addition or deletion of CPUs while in operation. While it might not seem immediately obvious to many where this would be used, the increasing use of virtualised systems will be able to make good use of this. Virtual hardware can then be tuned along with other system resources.

Backup compression has been a high-priority request for many years and SQL 2008 finally delivers it. In my testing on typical business accounting data, I have seen backups typically around thirty per cent of the size of the original data.

To assist with keeping systems highly available, a number of enhancements have been made. It is now possible to support database mirror failover partners without changes to the application connection strings. Details of the failover partner are cached by the client library. Mirroring also now supports compression of the data log stream between the servers and has the ability to recover a damaged data page on the primary server from a synchronised mirror partner.

### DYNAMIC DEVELOPMENT

Much has been written about the introduction of LINQ (Language Integrated Query), but this release also introduces the Entity Framework and the Visual Entity Designer. The Entity Framework allows developers to work at a higher conceptual level, and LINQ to Entities provides enhanced access to these constructs.

As a simple example, relational tables for Passengers and Flights would typically be linked by a FlightManifests or FlightPassengers table in a normalised relational model. While LINQ allows development against these underlying base tables on a one-to-one basis, the Entity Framework understands concepts like many-to-many relationships, inheritance and entities as constrained tables. It would allow modelling of Flights as a property collection in the Passenger entity and vice versa.

This is where developers would rather be working as it is closer to the business model involved. ADO.NET Data Services allow the secure exposure of entities via a REST-ful interface based on URIs.

The Sync Framework and SQL Server 2008 allow for easy construction of applications involving local data caches without the complexity and management overhead of replication. They also provide detailed support for conflict detection and out-of-the-box conflict resolution schemes. Custom schemes are also able to be created.

Finally, the T-SQL language has again been enhanced. A variety of minor 'delighters' such as += and variable initialisation have been added, but the most anticipated enhancements are the addition of the MERGE statement, which combines INSERT and UPDATE behaviour across a set of rows. Table-valued parameters allow an easily supported mechanism for passing more complex types into stored procedures and functions, and table-valued constructors provide the basis for other enhancements such as multi-row inserts. Support has been provided for ANSI grouping sets, and a new detailed object dependency tracking system has been implemented. In summary, the upcoming version of SQL Server again pushes the boundaries.




# Ambushing the iPhone

***Jenneth Orantia* takes a look at the latest swag of smartphones claiming to hold the mantle of 'iPhone killer'.**

Ever since the iPhone was announced at Macworld 2007, the world has been gripped by iPhone fever. Never before has a single mobile phone captured so much interest and attention outside of the geekosphere, and although it's only available for sale (under contract and locked to a particular carrier) in the United States, UK, Germany and France, users as far-flung as China and Australia have been spotted clutching iPhones that have been cracked to work on local networks.

A local launch date for the iPhone has not been announced, but rumours are rife that it's due for release 'early 2008', with Telstra as the likely carrier. As the anticipation builds for an Aussie iPhone, the question remains — what are the other mobile phone companies doing? The iPhone has been available for nearly a year in the United States, so surely the other phone makers have had enough time to come up with something equally if not more compelling?

We approached all the mobile phone manufacturers and asked them to send us their best 'iPhone killers' — phones that they deemed good enough to compete with Apple's handset. What we got back was an interesting mix of mobiles, most with a wider feature set than the iPhone and a few with innovative menu systems and input controls that (while stopping short of revolutionary, a description that Apple can legitimately lay claim to with the iPhone) are certainly more enthralling than what we've seen from them in the past.

A quick perusal of the iPhone's technical specs reveals that it isn't actually a cutting-edge phone on paper. Most mid-range to high-end mobiles are more than a match for its capabilities, and the iPhone could just as easily be defined by the features that it doesn't have, such as no stereo Bluetooth, GPS, MMS, 3G or HSDPA, as well as the lack of a replaceable battery, expandable memory and a hardware keyboard.

But to limit the iPhone to its features list is to completely miss the boat on what makes it so appealing, and that's the experience of using it — a lesson that Apple already taught with the iPod. Everything about the iPhone is beautifully-crafted, starting with the exquisite hardware design and continuing on through the gorgeous user interface, with brightly-coloured icons and screens, translucent dialog boxes, slick screen transitions and a multi-touch input mechanism that makes everything from web browsing to watching a movie an enjoyable process.




## FUNNILY ENOUGH, THE IPHONE'S BIGGEST COMPETITION MAY NOT EVEN COME FROM THE MOBILE PHONE COMPANIES

None of the mobiles we tested for this feature come close to matching the iPhone's amazing user experience. But that doesn't mean they're not worth considering if you're in the market for a new phone. The iPhone's main drawcard is that it's a sleek-looking mobile that's easy and fun to use, but if you want a handset with an excellent built-in camera, you're better off with the Nokia N95 8GB.

Likewise, if you write a lot of email and don't want to grapple with an on-screen software keyboard, then the Samsung F700 or i-mate Ultimate 9502 will be more suitable. And then there's navigation — while the iPhone has Google Maps, it doesn't actually have a GPS receiver built-in like the Mio A701, so you need to manually plot your location. Plus, all Google Maps data is downloaded over the air, which is cost-prohibitive and slow over EDGE or GPRS.

And then, of course, there's the minor detail of the iPhone not being officially supported in Australia yet. You can buy them on eBay or get a friend to send one over to you, but you'll have to run a fairly complicated procedure of getting it unlocked to work on a local carrier's network. Even if you manage to not brick the phone in the process (or you get it unlocked before you buy it), there's always the chance that Apple will brick your unlocked phone in the next software update, which is what happened with the iPhone's 1.1.1 firmware release. Finally, if your phone develops a fault or you need support, you're basically up the proverbial creek without a paddle.

For business users, it's worth noting that the iPhone doesn't make any pretensions towards being a smartphone and therefore has various limitations when it comes to using it within a work environment. While it supports multiple email accounts and can display rich HTML and Word and PDF attachments, it doesn't support Microsoft Exchange or BlackBerry synchronisation, nor does it let you natively create and edit Word files or view spreadsheets (although there are workarounds using online productivity suites like iZoho). You also need iTunes installed on your PC to synchronise it with Outlook, which may prove problematic for those with a locked-down machine at work.

However, many of these limitations may disappear once Apple releases the iPhone SDK, which will allow third-party developers to write native applications for the iPhone. Already, there are dozens of web-based applications and home-brew programs available for the iPhone that add everything from internet radio streaming to SSH access, but once the SDK hits (originally due by the end of February, but delayed at time of writing), the iPhone's software library may very well rival that of Windows Mobile, which easily numbers in the thousands.

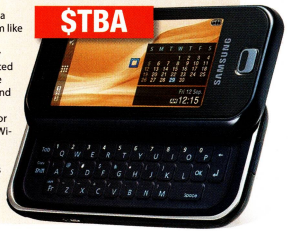
Funnily enough, the iPhone's biggest competition may not even come from the mobile phone companies. Waiting in the wings is Google's Linux-based Android platform, which has partners including Samsung, LG and HTC reportedly working on Android-based handsets. Andy Rubin, one of Android's co-founders and Google's director of mobile platforms, anticipates that Android will revolutionise mobile telephony. "We hope Android will be the foundation for many new phones and create an entirely new mobile experience for users, with new applications and new capabilities we can't imagine today," he wrote on the Official Google Blog.

Regardless of whether you want to get an iPhone or you're happy to stick to the handsets that are locally available, there's no denying the profound and far-reaching impact that the iPhone has had on the mobile phone industry. Web browsing, email and multimedia playback are features that have been available on mobile phones for years — however, Apple's multi-million-dollar marketing machine (not to mention an insatiable interest for anything iPhone-related in the media) has made consumers more aware of these additional functionalities. Most (if not all) of the features available on the iPhone are available on the mobiles we've tested for this feature — they're just not as pretty or as easy to use.

# Samsung Ultra Smart F700

$TBA

The Ultra Smart F700 bears the closest resemblance to the iPhone, with a 3.2in touchscreen display and a single button on the front for bringing up the shortcuts menu. Yet it doesn't have the same 'wow' factor that's made the iPhone so coveted, mainly because it's made of plastic, but also because the user interface is fairly basic. The F700 is 7.2mm thicker than the iPhone, but the extra girth is due to a slide out QWERTY thumb-board. Like the iPhone, Samsung has abandoned stylus input in favour of a finger-driven interface, and haptic feedback (which is where the screen vibrates when you press it) gives it a leg up on Apple's creation. But the F700's menu system isn't much different from the standard mobile phone menu system. For a handset that calls itself 'Ultra Smart', we found that the F700 fell short of smartphone standards. Large touchscreen and built-in keyboard aside, it's essentially a regular mobile. On-board applications consist of a handful of simple programs like PIM, messaging and a world clock, and as it doesn't run a smartphone platform like Windows Mobile or Symbian, third-party applications are limited to Java software. The F700 supports tri-band GSM/GPRS for voice and 3G and HSDPA for data, but there's no Wi-Fi. Web browsing is sub-par, email isn't user-friendly, and it's plain text messages and attachments only supported.




# i-mate 9502

$1,099

Of all the smartphones in i-mate's 'Ultimate' range, the 9502 is the most deserving of the title. Not only does it achieve the wireless hat trick of 3G, HSDPA and 802.11b/g WLAN connectivity, but it's also the first mobile on Telstra's Next G network to feature high-speed data uploads via HSUPA. It's bulky, due to the QWERTY keyboard hiding behind the slide-up 2.8in touchscreen panel, as well as other high-end features like the integrated GPS receiver, VGA-res screen and 3MP auto-focus camera. As with other Windows Mobile 6 Pro mobiles, it has the full suite of Outlook, Office and other desktop-equivalent apps, and it's compatible with Microsoft Exchange push synchronisation for email and other PIM items. Also, it has audio and video out using the supplied composite cable. The Ultimate 9502 is one of the most full-featured mobile phones currently available, but it's not an iPhone killer in the strictest sense, due to its utilitarian appearance and business-like features. On those fronts, the 9502 is extraordinary.




# LG Viewty U990

$899

Clad in the same iPhone black finish (but with silver accents along the frame), the Viewty has a similar-sized 3in touchscreen dominating the front and three buttons below it for answering calls, ending calls and — oddly — a clear button, where a button for bringing up the main menu would've probably been more useful. The standby screen bears more than a passing resemblance to the iPhone, but instead of sweeping your finger across the screen to unlock it, there's a button on the right-hand side for turning keylock off — a button that doubles as the image stabiliser when in camera mode. Its main claim to fame is a 5MP digital camera with a Schneider-KREUZNACH lens, auto and manual focus and a Xenon flash — a significant improvement over the iPhone's 2MP camera. Plus, the Viewty's camera can record movies (in DivX format, no less), unlike the iPhone, and video files can be uploaded directly to YouTube. But despite the hype, image quality isn't quite as good as expected — objects had a distinct softness in our test snaps, and colours lacked the vibrancy that you'd get from a dedicated five-megapixel snapper. As for the user interface, it's fairly run-of-the-mill aside from the haptic feedback vibration, with a row of tabs along the right-hand side and applications represented on an icon grid. Most of the buttons are large enough to tap with your finger, but LG throws in a stylus for accessing the smaller icons in the taskbar.



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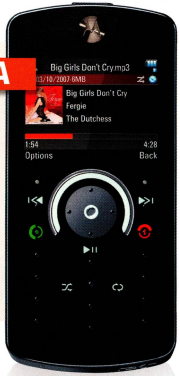
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# Motorola ROKR E8

$TBA




The iPhone is all about making complex tasks easier, and the ROKR E8 has a similar goal — it just goes about it differently. While the iPhone concentrates on making each screen as intuitive and useful as possible, the E8 focuses on its three main functions — phone, music player and camera — and only presents buttons relevant to each function on the virtual 'morphing' keypad. But we're not so sure that this makes a huge difference in usability. The transition between modes certainly looks cool, with the red virtual buttons contrasting nicely against the glossy black front, but all it really does is replace the numeric keypad with a few context-sensitive buttons. Not that the ROKR E8's menu system is difficult to use, but it's still very phone-centric. Our test unit was a pre-production model, so some of the quirks we experienced are hopefully fixed on shipping units. Given that one of the E8's primary modes is the camera, it's a shame it's so basic: two megapixels with fixed focus, and no flash or other fancy features. However, the music player is decent. There's 2GB of internal storage with microSD expansion, and a full 3.5mm earphone jack. Audio quality is exceptional, especially once you start tweaking the bass boost and equaliser settings, and the music player program supports album art and sorting by ID3 tags. You can also connect stereo Bluetooth headphones — something the iPhone is yet to offer. With more work on the user interface, larger internal storage and a bigger screen, Motorola could have a real winner.

# Mio A702




apc Highly Recommended

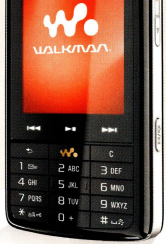
$899

Mio is best known for its portable navigation devices, so it's no surprise that the A702 puts a heavy emphasis on GPS. A follow-up to the A701, it has welcome improvements like a hardware keypad and 802.11b/g Wi-Fi, but we can't help feeling it's a case of two steps forward, three steps back. The A702 is still stuck on the same tri-band GSM/GPRS radio stack with no 3G or HSDPA in sight, and the speedy 520MHz processor in the A701 has been downgraded to a 200MHz TI OMAP 850 chip — a change that's felt when you're running multiple programs alongside GPS. The A702 runs Windows Mobile 6 Pro, and on top of the standard entertainment and productivity software that comes with the platform, Mio has added some interesting apps: Contact Guard, which password-protects your contacts, call history and SMSs; Mio Blacklist, which filters phone calls and text messages from specified senders; and Emergency Locator, which sends an SMS to preset recipients with your location data. But the main drawcard is Mio Map 3, which uses the latest Sensis Wherels R14 maps stored on 1GB of internal storage. Unlike the iPhone the A702 finds your position automatically (and quickly) using the 20-channel SiRFstar III GPS receiver. Mio Map's interface is confusing, but once you get the hang of it, navigation works well. It has all the features of Mio's standalone GPS units but he A702 is no iPhone killer. If satellite navigation is high on your list of priorities and you don't want to pay for map downloads over the air, it's well worth considering.

# Sony Ericsson W960i

$1,099

The W960i has a few similarities to the iPhone. It's multimedia-centric, has a large touchscreen (albeit nearly an inch smaller at 2.6in) and comes with 8GB of non-expandable memory and built-in Wi-Fi. It may not be super-model sexy like the iPhone, but it's a handsome device all the same, with a glossy black front, rounded corners, white trim and soft touch black rear that feels great in the hand. However, the experience of using the W960i is a let-down. You can navigate through the menu system using the touchscreen, stylus or side-mounted jog dial, but it's a complex user interface that's made all the more frustrating by the sluggish 220MHz ARM9 processor. It may be branded as a Walkman, but it's technically a smartphone as it runs the UIQ 3.1 OS (based on Symbian 9.1). It's not our favourite platform, but it has a respectable library of third-party apps available (which you probably won't need as it comes with an assortment of software, including Exchange ActiveSync, Quickoffice, Opera and MusicDJ). The revamped Walkman app takes its cues from the Sony PSP's excellent media browser, but it's a shame that movie and picture files have to be accessed through separate programs. Nevertheless, the W960i lives up to its Walkman heritage, and we'd say the music player is on par with the iPhone's. The proprietary headphone connector is a disappointment (although an adapter is in the box, and it also supports Bluetooth), but we like the touch-sensitive music playback buttons below the screen which only appear when you're playing music or videos.



# HTC Touch Dual 850




We've yet to find a user interface that's as awe-inspiring as the iPhone's, but the Touch Dual comes closest with its innovative TouchFLO application. Sweeping a finger from the bottom of the screen to the top brings up a three-sided launcher that rotates like a cube when you drag your finger across the display. One side has photo speed dials, the other has application shortcuts for commonly-used programs like email, SMS/MMS and Internet Explorer, and the final one has multimedia shortcuts for music, photos and videos. There are other, more subtle enhancements that HTC has applied to Windows Mobile 6 Professional to make it easier to use with your fingers, but scratch below the surface and it's still the same kludgy Windows Mobile operating system that we love to hate — only, because the Touch Dual's screen is slightly smaller than average at 2.6in, buttons and icons are a little harder to hit without digging out the stylus. But, with quad-band GSM/GPRS, 3G, HSDPA, and stereo Bluetooth support, the only features it doesn't have are built-in GPS and Wi-Fi. The Touch Dual is arguably the sexiest Windows Mobile 6 Pro handset we've come across, and with its slide-down QWERTY thumb-board for fast text entry, and processor speed at a zippy 400MHz, it's undeniably stylish and powerful, and we rate it as the strongest iPhone-killer contender after the Nokia N95 8GB.

# Nokia N95 8GB




Before the iPhone came to town, the original Nokia N95 was widely regarded as the 'Jesus Phone'. Now that the iPhone has this honour, can the 8GB revision of the N95 take the title back again? It really depends on whether you value features over fashion. Save for the smaller 8GB capacity (the iPhone is available with up to 16GB of storage), the revised N95 trumps the iPhone in nearly every feature and brings more to the table besides, including built-in A-GPS, 3G, HSDPA and DVD-quality video recording. It just doesn't look as pretty as the iPhone. As far as mobiles go, the N95 is better-looking than most, but a 21mm thickness makes it almost twice as fat as the iPhone. Still, it's a chubbiness we're happy to deal with, as the N95 excels at everything. The 5MP camera with a Carl Zeiss lens is packed with features and takes excellent photos and video, and multimedia playback is superb thanks to the sharp 2.8in QVGA display, powerful speakers and easily-accessed 3.5mm headphone jack. Unique to the N95 8GB is that it's equally adept at entertainment and productivity — a feat that the iPhone can't lay claim to. It runs the Series 60 third edition OS, which has a wealth of third-party and Nokia-developed software available for it, and it's packed with programs out of the box, including Quickoffice for viewing and editing Word, Excel and PowerPoint files, RealPlayer for playing movies, and Nokia Maps for satellite navigation. Like its predecessor, the N95 8GB has a dual slider design that slides up the normal way to reveal the numeric keypad, and the reverse direction to reveal media playback keys. Aside from that, the N95 uses a conventional five-way controller and hard keys for navigating the menu system, and programs are arranged in the stock-standard icon grid. However, there are certain areas — like the revamped multimedia menu and the N-Gage Arena gaming platform — where the user interface has the same awe-inspiring appeal as the iPhone.


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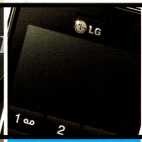


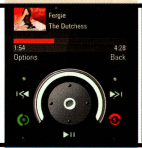

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# smartphones

| | SAMSUNG ULTRA SMART F700 | LG VIEWTY U990 | HTC TOUCH DUAL 850 | I-MATE ULTIMATE 9502 |
|---|---|---|---|---|
| **Price** | TBA | $899 | $929 | $1,099 |
| **Web** | www.samsung.com.au | www.three.com.au | www.telstra.com.au | www.telstra.com.au |
| **Dimensions** | 112 x 56 x 16mm | 103.5 x 54.4 x 14.8mm | 107 x 55 x 15.5mm | 116 x 60 x 17.8mm |
| **Weight** | 139g | 112g | 120g | 200g |
| **Network modes** | Tri-band GSM 900/1800/1900 | Tri-band GSM 900/1800/1900 | Quad-band GSM 850/900/1800/1900 | Quad-band GSM 850/900/1800/1900 |
| **Data services** | GPRS, EDGE, HSDPA | GPRS, EDGE, WCDMA, HSDPA | GPRS, EDGE, UMTS, HSDPA | GPRS, EDGE, UMTS, HSDPA, HSUPA |
| **Talk time** | 4.5 hours | 3.3 hours | 4 hours | 4.3 hours |
| **Standby time** | 300 hours | 270 hours | 325 hours | 180 hours |
| |  |  |  |  |
| ✔ | Slide-out QWERTY keyboard is great for email. | DivX video recording; looks like the iPhone. | Funky TouchFlo interface; sexy hardware design. | Has every wireless connection; sharp VGA-resolution screen. |
| ✖ | Limited on-board and third-party applications; no Wi-Fi. | Image quality could be better. | Need to use the stylus in many places. | Bulky; unattractive. |
| **Verdict** | ★★★☆☆ | ★★★½☆ | ★★★★☆ | ★★★½☆ |

| | MOTOROLA ROKR E8 | NOKIA N95 8GB | MIO A702 | SONY ERICSSON W960I |
|---|---|---|---|---|
| **Price** | TBA | $1,249 | $899 | $1,099 |
| **Web** | www.motorola.com.au | www.nokia.com.au | www.mio-tech.com.au | www.sonyericsson.com.au |
| **Dimensions** | 115 x 53 x 10mm | 99 x 53 x 21mm | 117 x 59 x 21.8mm | 109 x 55 x 16mm |
| **Weight** | 100g | 128g | 155g | 119g |
| **Network modes** | Quad-band GSM 850/900/1800/1900 | Quad-band GSM 850/900/1800/1900 | Quad-band GSM 850/900/1800/1900 | Tri-band GSM 900/1800/1900 |
| **Data services** | GPRS, EDGE | GPRS, EDGE, UMTS, HSDPA | GPRS, EDGE | GPRS, EDGE, UMTS |
| **Talk time** | 5 hours | 3.5 hours | 4 hours | 9 hours |
| **Standby time** | 300 hours | 280 hours | 200 hours | 370 hours |
| |  |  |  |  |
| ✔ | Ultra-slim; 2GB of internal storage. | Packed with features; easy to use. | Built-in GPS and on-board maps. | Excellent music player; 8GB internal storage. |
| ✖ | Morphing keypad is gimmicky. | Chunky; non-expandable memory. | Dated design; cramped keypad. | Proprietary headphone jack; difficult user interface. |
| **Verdict** | ★★★☆☆ | ★★★★½ | ★★★★☆ | ★★★½☆ |

AOC




# EYES' BEST FRIEND

916Vwa/916Swa



| Model Name | 916Swa | 917Vw | 2216Vw | 210V | 212Va | 416V |
|---|---|---|---|---|---|---|
| Screen Size | 19" Wide | 19" Wide | 22" Wide | 22" Wide | 22" Wide | 24" Wide |
| Brightness | 300 cd/m² | 300 cd/m² | 300 cd/m² | 300 cd/m² | 300 cd/m² | 300 cd/m² |
| Contrast Ratio | 2000:1 DCR | 3000:1 DCR | 3000:1 DCR | 2000:1 DCR | 2000:1 DCR | 3000:1 DCR |
| Response Time | 5ms (typ) | 5ms (typ) | 5ms (typ) | 5ms (typ) | 5ms (typ) | 5ms (typ) |
| Connectors | Analogue | Analogue & DVI | Analogue & DVI | Analogue & DVI | Analogue & DVI | Analogue & DVI |
| Built-in Speaker | Yes | – | – | – | Yes | – |
| Colour Scheme | Black | Glossy Black | Black | Black | Black / Silver | Black |

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# Small business & workgroup servers

***Nick Race* takes a look at the newest small business servers on the block.**

Servers really are the heart of a business network (and some enthusiast's home networks). Choosing the right technology to fulfill the needs of the users isn't as simple as taking a box and adding CPUs until it starts working, but requires a combination of management, flexibility, upgradability and usability. With many small businesses still working around the horribly inefficient peer-to-peer style network, sharing files or hosting printers off PCs, moving to even a minimally specced but dedicated server system can improve performance and productivity dramatically.

We've rounded up some servers at a few different price points and usage models from a few vendors. ASUS has submitted a machine perfect as a file server, Altech's spot on as a do-everything small business server solution, while HP's Proliant ML110 has the entry level covered for the smallest SOHO. IBM came to the party with a new idea on tried and true Blade technology, but optimising it (without dumbing it down) for small business needs.

With the approaching Microsoft Windows Server 2008, many people working with beta and release candidates have been excited to see the new offerings available, so expect plenty of movement in the server space in the very near future.

## WATCH THIS SPACE

**Additionally, vendors Sun Microsystems, Dell, Apple and Acer were invited to submit servers for our consideration but, unfortunately, due to deadline constraints, they weren't received in time. Look for reviews in the near future from Sun, Dell and Acer.**

# ASUS TS300-E5/PA4

## Inexpensive (and serves it up right out of the box).

The TS300-E5/PA4, apart from the imaginative name, uniquely includes four Gigabit Ethernet connections out of the box. Aimed primarily at upping the available bandwidth to and from the server directly to storage (be it NAS or IPSAN), the PA4 would be well suited to bandwidth-heavy applications, like a file or exchange server. The PA4 uses Broadcom BCM5721 PCI-E GbE chipsets.

This model is an inexpensive UP (single CPU) server designed for Intel Xeon 3000 and 3200 series processors in dual- or quad-core. Using a single CPU socket reduces the chipset and CPU costs, so the budget-minded can get away with a reasonably powerful system without breaking the bank. The server is built around the Intel 3210 MCH chipset, a 1333MHz FSB compatible SKU which includes support for Intel's new 45nm processors. The 3210 uses dual-channel DDR2 up to 800MHz with ECC over four slots and a maximum load out of 8GB. As tested, ASUS provided the system with 4GB of DDR2 ECC.

Our system was configured using the Intel Xeon 3040 processor, an 'Allendale' 65nm model with two cores and 2MB of L2 cache. The 3040 runs at 1.86GHz on a 1,066MHz FSB. As the TS300-E5/PA4 uses the UP Socket 775, choices for Xeon processors are quite limited. Though with the imminent release of the dual-core 'Wolfdale' and quad-core 'Yorkfield' processors on a 45nm process with 6MB L2 caches, the future is looking brighter for Socket 775 users.

The TS300-E5 is a pedestal-only chassis, without options to mount it in a rack. Without some mod-cons, like tool-less entry and hot plug power, the TS300-E5 is a fairly solid chassis with excellent cooling characteristics. The chassis includes four hot-plug SATA bays, accessible from the front of the case. The case was fitted with a 450W ASUS 45GA PSU which ran cool and quiet during testing. Also included was an ASUS optical drive, and two of the bays were populated with Western Digital RE16 drives in a RAID 1 configuration run off Intel's ICH7R southbridge.

On the bench the ASUS TS300-E5/PA4 combo ran like a dream, with the chassis providing good cooling with less ear-shattering fan noise. Performance was more than adequate for use as a file server, though adding another disk for RAID 5 would see a speed increase to access off disk. The four Gigabit Ethernet connections made it ideal for bonding for a high-speed connection to a Gb switch or direct connect to NAS or IP SAN.

There's no major fault we can pick with the ASUS TS300-E5/PA4, though its usage model is quite specific and there are a few caveats. We would have liked to see a slightly more powerful PSU for a bit of overhead, while lack of tool-less entry and maintenance in the case makes on-site work a little more onerous, and be aware of the server's Socket 775 requirements. But, for a very inexpensive, roll-it-out file server or entry-level Exchange server, the ASUS TS300-E5/PA4 would suit well.

- CONTACT ASUS
- ONLINE www.asus.com.au
- MARKET SMB
- PRICE $1,849

✔ Cooling; four GbE; hot plug SATA.

VERDICT ★★★½☆

✖ Tool maintenance; Socket 775.



**The TS300-E5 is a pedestal-only chassis, with no rack options.**

# HP ProLiant ML110 G5 P/N: AK398A

## Entry-level server for those on a budget (or with limited needs).

The ML110 is truly the baby in HP's server family and comes in at the appropriate price. This is a very entry-level server, lacking many of the physical features of a higher end machine. The ML110 chassis provides no hot plug or drive bays, no hot plug power supply and is more akin to the feature sets seen on desktop PCs. In the box, however, it's a different matter. The ML110 uses a tried and true workstation/server chipset, Intel's 3200 MCH. This chipset is compatible with CPUs running up to 1333MHz frontside bus, ECC DDR-2 memory and a single 8x PCI-E slot for expansion.

As submitted to *APC*, the HP ML110 was running an Intel Pentium E2160 Dual-Core, a 1.8GHz chip using an 800MHz front side bus in a Socket 775. The E2160 uses the 'Allendale' architecture similar to the Xeon 3040, but with less cache. Also fitted with two 160GB Seagate Barracuda ES hard disk drives and a DVD-ROM, the ML110 uses an embedded NC105i PCI-E Gigabit Ethernet adapter, with a single port and is powered by a 365W PSU. That's a little underpowered in my book; however, with a maximum of four hard disk drives fitting in the chassis, it should get away with it. The ML110 is also available in a UP Xeon configuration using the 3065 model a 2.33GHz, which would provide a bit of a boost to processing power over all.

As with all HP servers, the ML110 G5 includes HP Lights-Out technology reporting on board, but includes a slot for HP's LO100i expansion card for 100 series servers. This allows access to HP's Lights-Out out-of-band management in the entry-level servers where necessary. It's a good option to have for remote management of remote offices, but the cost is only applicable if you stump for the upgrade.

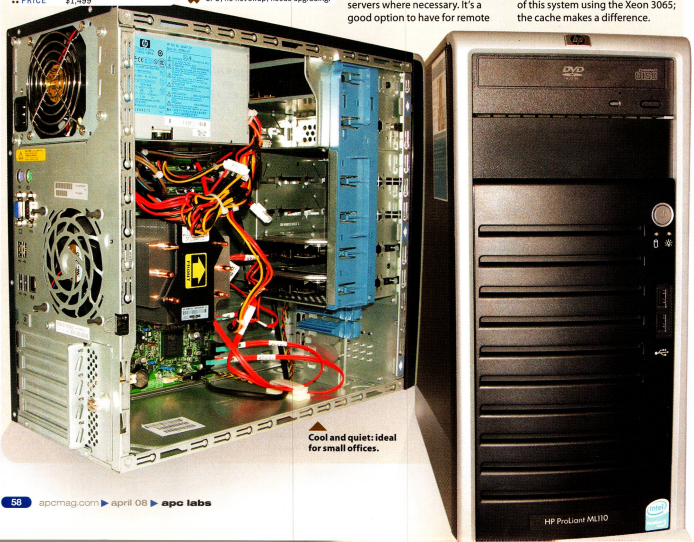
On the bench the ProLiant ML110 G5 runs cool as a cucumber with minimal noise, ideal for small offices without dedicated server space. The system runs Small Business Server 2003 R2 and does so at a reasonable clip. Running SBS with a full complement of roles seemed slightly sluggish compared to some of the more well-appointed systems in the Labs. As a file server, or backup server, we'd be happy with it (and saving a few dollars), but if you're requiring a bit more under the hood, then stump for the version of this system using the Xeon 3065; the cache makes a difference.

- CONTACT HP
- ONLINE www.hp.com.au
- MARKET SMB
- PRICE $1,499

✔ Price; upgradeable.

VERDICT ★★½☆☆

✖ CPU; no hot swap; needs upgrading.




Cool and quiet: ideal for small offices.

# Altech Kronos




## Solid performance for up to twenty workgroup users.

Altech submitted a heavily ASUS-branded server for review. Built in an ASUS TS500-E4 chassis with the PX4 motherboard, the machine looks remarkably similar to the system ASUS submitted themselves, though the difference in performance is much more noticeable.

Where the system sent from ASUS direct used a single Socket 775 motherboard based on the 3210 MCH, Altech's submission uses the Intel 5000V chipset designed for use with dual- and quad-core Xeon processors using Socket 771. The Intel 5000V supports a frontside bus of 1,333MHz and support for 16GB of RAM (ECC at DDR2-667). The system will directly support Intel Xeon 5000 and 5100 series dual-core chips, as well as X5300 series quad-core Xeons in a dual processor configuration.

Integrated into the ASUS motherboard, this allows much greater flexibility and potential performance than the 3210 MCH, while still maintaining a reasonable price point with a single processor.

Altech built up the basic ASUS kit with a single Intel quad-core Xeon X5365 running at 3.0GHz on a 1,333MHz FSB. The X5365 includes 8MB of L2 cache (4MB on each pair of cores), and is based on the 'Clovertown' iteration of the Core architecture. The X5365 runs a thermal profile of 120W, so running a few of these servers in a smaller space will need some active cooling. The next jump up possible on the 5000V chipset is the 'Harpertown' E5400 series quad-core Xeons running at 1,333MHz, which offer more cache at 12MB and an 80W thermal profile. A second CPU socket remains empty for future upgrade flexibility. The ASUS motherboard supports up to six dual-channel fully buffered DIMMs up to 667MHz. Altech's Kronos system was populated with four 1GB sticks of Corsair FB PC-5300.

The system was further fitted with four Samsung HD501LJ SATA II hard disk drives with 16MB Cache in a RAID 5 configuration. The drives are housed in a hot-pluggable four drive SAS enclosure, powered by an LSI-branded, ASUS-provided, RAID controller card capable of levels 0, 1, 1E and 10E. The controller card uses one of the server's PCI-X 133 slots. The card includes an external port for connecting SAS-compatible devices or enclosures. One of the strong points of the SAS standard is the ability to mix and match where required, using high-speed high-cost SAS drives where necessary and sticking to slower but much more capacious SATA drives in other situations without any hardware reconfiguration.

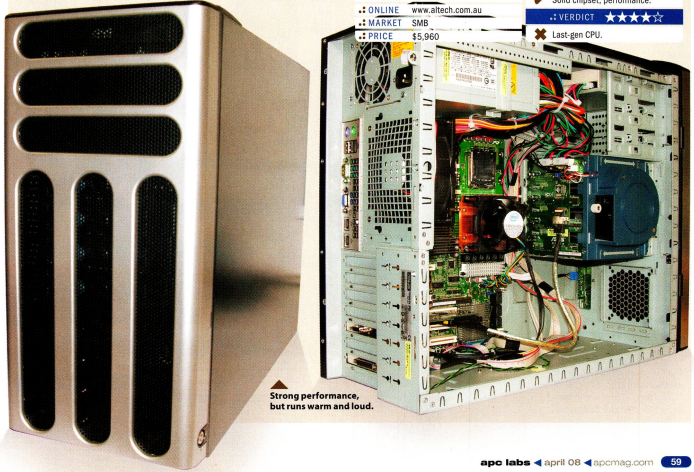
On the bench the Altech Kronos ran up with Windows Small Business Server 2003 R2 just fine. The system performed to expectations under multiple server roles, and, as a machine to look after a 20-odd user workgroup or office, it hits the nail on the head for out-of-the-box performance, value and future upgradeability. Of course, we would have loved to have seen a 'Harpertown' Xeon X5400 in there for a saving in the thermals and the extra cache for a speed bump. Also, compared to the ASUS TS300-E5/PA4, the unit runs noticeably warmer and louder under load, so consider keeping it away from users in remote offices.

| | |
|---|---|
| CONTACT | Altech |
| ONLINE | www.altech.com.au |
| MARKET | SMB |
| PRICE | $5,960 |

✔ Solid chipset; performance.

VERDICT ★★★★☆

✖ Last-gen CPU.



Strong performance, but runs warm and loud.

# IBM BladeCentre S Chassis, LS21 and HS21 Blade Servers

## Blade setups aren't out of the question for small business anymore.

The Blade is no longer purely a data centre technology. With power, space and cooling increasingly on the minds of businesses and purchasers, moving to Blade technology is a good way of reducing overhead on systems and already overstretched resources. IBM and HP are both playing in this space, with offerings for small businesses to get their own data centre in a box. At first it sounds counter-intuitive, with the impression that Blade implementations are big, power-hungry and worthwhile for tens or hundreds of servers. However, these new models offer a simplicity that standalone servers can't. With server power distribution, Ethernet connectivity storage and processing power all in one box, it's closer to a drop-in and plug-in model for even moderately complex setups.

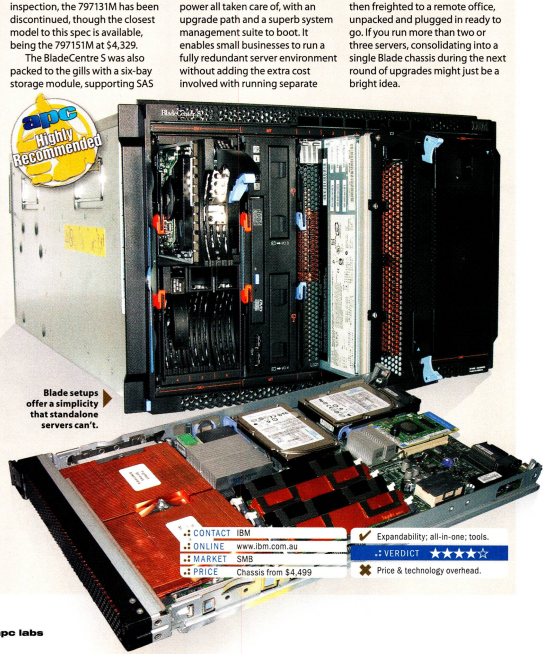
For review we received IBM's BladeCentre S Chassis, a seven-slot Blade chassis capable of holding up to six Blade servers and two storage modules, both with room for six 3.5in hard disk drives. The six server slots can support two processors each, either AMD Opteron or Intel Xeon chips, as your requirements demand. The chassis also includes room for four-layer 2-7 four-port Ethernet switches, with a direct connection to each of the Blade and storage modules. The switch slots can also hold fibre channel and SAS storage options. Four power supplies keep the whole thing running, while all switch, cooling and power components are hot-swappable. The chassis also houses an optical drive for OS and application installation.

IBM included two Blade servers in our product review unit. One was the HS21 DP Xeon unit, (8853A2M) including a single quad-core Xeon X5335 processor (with room for another) and 2GB of DDR-667 FB. The system also included two 2.5in 73GB 10K RPM SAS drives driven by an LSI 1064 SAS controller. The 8853A2M version of the HS21 blade comes in at $3,999.

On the flip side, IBM includes an older Opteron unit, the 797131M, including a single 2.0GHz Opteron, 3GB of DDR and no hard disk drive (however the same LSI 1064 SAS controller is included). Upon further inspection, the 797131M has been discontinued, though the closest model to this spec is available, being the 797151M at $4,329.

The BladeCentre S was also packed to the gills with a six-bay storage module, supporting SAS (and SATA) drives in a hot-plug configuration. The storage module was populated with four 73GB 10K RPM SAS drives. The Chassis can contain two of the storage modules, for a total of 12 drives.

So what does all this add up to? A small business server network in a box, with storage, networking and power all taken care of, with an upgrade path and a superb system management suite to boot. It enables small businesses to run a fully redundant server environment without adding the extra cost involved with running separate systems including racks, power distribution and cooling, management and replacing. A direct upgrade path just means adding an extra Blade server where required, with little hardware tinkering and power and networking already provisioned to it. It can be configured in-house then freighted to a remote office, unpacked and plugged in ready to go. If you run more than two or three servers, consolidating into a single Blade chassis during the next round of upgrades might just be a bright idea.



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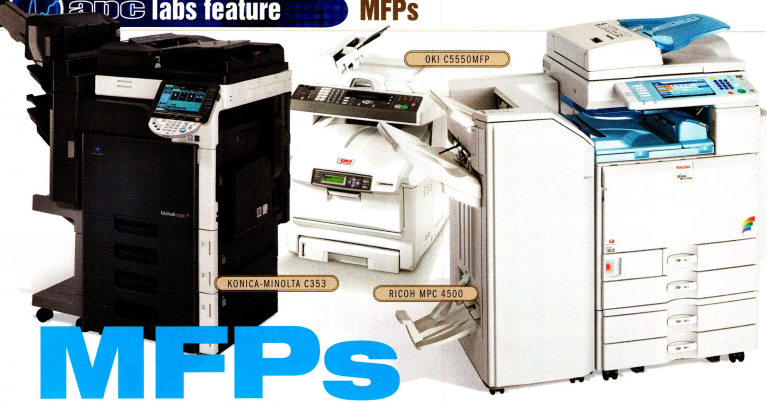
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# MFPs that work for business

**Would you cut costs by allowing a multifunction product to replace all of your standalone printers, copiers and faxes? *APC* assesses business MFPs on the market.**

We've been hearing the promises of multifunction device vendors for years — that their machines can replace all the standalone printers, scanners copiers and fax machines at work. But, in retrospect, the claims were inflated at first, OKI Printing Solution's managing director Graham Harman points out.

Harman says: "Today we have a number of genuine multifunction devices, but initially they were not true multifunction devices — they were OK at one thing, but not others simultaneously. Also, when the first lot of multifunction devices came out, you had low-end ones from Brother, Lexmark and Canon. They were inkjet-based and relatively slow. For a lot of people, the first introduction to a low-cost MFP was a printer with a scanner bolted on the top, and maybe a fax machine."

While the promise was there, the first batch of technology wasn't suitable for the heavy printing, scanning, copying or faxing needs of businesses. But even now, as the MFPs have improved, there is a big gap between the consumer MFPs and those meant for business.

"A business really can't look at the low-cost department store machines," says Harman. "These are designed, made and bought for the home. Most are inkjet and are also known in the industry as 'ink drinkers'. They use up ink like crazy. When you are at home and print a ream of paper once a year, it doesn't matter, but in business, if you're printing 30,000 pages monthly a consumer MFP won't cut it, so you need to buy a machine that is designed for business."

> MOST CONSUMER MODELS ARE INKJET AND ARE KNOWN IN THE INDUSTRY AS 'INK DRINKERS'

So what makes a business MFP? John Venett, National Marketing Manager for Konica Minolta Business Solutions, says "The major difference is productivity, which effectively means the time taken to complete any task is less [than a consumer MFP]." Pointing to Konica Minolta's latest bizhub range as an example, he says: "Productivity includes efficient printing in colour with high-speed processing and compatibility with a wide range of operating systems and software. When it comes to copying and scanning, the bizhubs will process work at up to 15% more productively than most other products and up to 50% more than consumer products."

But — there *are* specific qualities that set MFPs from consumer devices.

## DUTY CYCLE

Duty cycle is the simplest way of defining a business MFP. It's an industry benchmark which refers to the number of copies or prints that an MFP can reliably produce each month. Exceeding the duty cycle number can lead to equipment breakdowns. A consumer MFP will have a duty cycle of around 1,000 pages a month, but a heavy-duty business MFP will do around 30,000 or more pages a month. OKI's flagship business MFP does around 150,000 pages a month. The duty cycle is also important because — if the business does not print or copy in numbers close to the duty cycle — it could have overcapitalised on the equipment.

Brother Australia's Stephen Bennett, in charge of technical support for Brother's Pre-sales and Networking Printing Solution, says a business MFP needs to have a high duty cycle and also Lightweight Directory Access Protocol (LDAP) , a set of protocols for accessing information directories. This makes it possible for any application on virtually any computer platform to obtain directory information, such as email addresses and public keys.




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### LASER-BASED ENGINE

A business MFP will need a laser engine, says Harman. Although some inkjet MFPs are aimed at business, in reality they will be more expensive to run because of their heavy consumption of ink and will be slower than MFPs with laser engines.

For a business, says Ricoh Australia's David Hampe, National Product Group Manager, Printers & Scanners, it's all about running costs. "The smaller MFPs are more expensive to run than the bigger machines. Why are the business MFPs cheaper to run? The engine is different, the toner, the drum and the collector are separate, so you don't have to replace them all at the same time. You will get a lot of life out of the drum and change the toner separately. Whereas in a small device you have a cartridge, the drum is part of the cartridge, so when you throw the cartridge you also throw the drum away. Of course, the beauty of the cartridge is that there is no mess, but the drawback is higher costs."

While laser engines set the standard for low-cost printing, some vendors are trying to push inkjets into the business market. HP's Edgeline range of very high-end MFPs uses inkjet technology with dramatically different printheads which cover an entire page being printed, enabling high speeds of up to 50ppm. They also have relatively low running costs, but the technology is currently in use only in expensive corporate MFPs and printers.

Brother's Bennett says the most fundamental cost saving with MFPs for a business is the fact that they not just replace multiple standalone devices, but they also cut down on the costs of the consumables, often because they use just one set as opposed to the three or four different kinds that would be used by standalone devices.

### COLOUR

Colour is essential for a business, although the need can vary from department to department. One corporate user told *APC* that it decided the accounting department didn't need a colour printer. But colour is a prerequisite for smaller businesses.

Companies like OKI are basing their entire marketing philosophy on providing high-quality colour for small print runs. Harman says "We use an LED technology that means, firstly, we can get a high-quality output, and, secondly, because our technology has a straight-through paper path, we can print on thicker paper, such as 300gsm paper. Customers can print business cards as they need and print colour brochures on demand. You no longer have to order, say, 500 brochures from the print bureau and then have to throw away the ones you don't need."

### PRINT SPEED

A fast print speed is a consistent feature of all business MFPs, and it's a key influence on the cost of the devices. The smaller the workgroup the less important speed is, but, in general, industry insiders say that you should buy the fastest speed that fits your budget. Be aware that nothing ever prints at rated speed, and always check the mono and colour speeds. Sometimes something rated at 20 pages per minute (ppm) in mono will only do 4ppm in colour.

### COPY SPEED

In a business environment where a lot of copying is done, it's important not to forget copy speed. A genuine copier will copy at least 20 ppm. It should also copy in mono or colour.

### NETWORKING

Business MFPs need to be networked, and many come with network-specific functionality. A popular one is print management, which either comes with the MFP or as a separate third-party application. Harman says: "If you're finding that someone is chewing up a lot of colour prints, you can restrict people printing colour. You can also get a report at the end of the month where you see, by operator, who is using the machine,



## IF I'M RUNNING A SMALL BUSINESS AND DOING DAY-TO-DAY BUSINESS APPS, AN MFP SUITS ALL MY NEEDS

how many copies are being done. In a legal environment where you want to charge customers individually, this is essential."

Using print management applications, a business can also determine whether it has the right-capacity MFPs in the right area, ie. if a high-capacity MFP is in a low-usage environment, it's being underutilised.

### SO CAN AN MFP REPLACE STANDALONE DEVICES?

Absolutely, says Ricoh's David Hampe. "If I'm running a small business and doing day-to-day business apps, the answer is yes, an MFP printer or copier will suit all my needs. If it has a network card in it I can have a true network type printer and scanner and copier. If I have, say, five machines in my small business, we can print quite happily to that copier and printer, and I can also scan to my networked PCs."

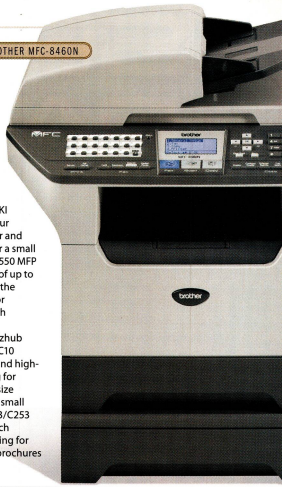
We asked some of the vendors to nominate machines for different-sized businesses.

Hampe points to the Ricoh GX 3000F, a multifunction inkjet device with a 29ppm colour print speed, or an even smaller laser, the new SP C222SF, as entry-level models for a small business. When the business exceeds 50 employees (but less than 100), the Ricoh MP C3500 (35ppm mono, 35ppm colour) or MP C4500 (45ppm mono, 40ppm colour) are more appropriate.

Bennett says the Brother mono laser MFC 7220 (20ppm) is a good place to start, but for a business with more than 20 people, the 7820N, a 5-in-1 Flatbed multifunction with laser printer, fax, scanner and copier is ideal. For a business of up to 50 people, the 8460 will do the job, and for 50 plus, the 8860DN.

Harman says the OKI C3530 MFP, an A4 colour printer, scanner, copier and fax machine is ideal for a small business, while the C5550 MFP is ideal for workroups of up to 10 users. Beyond that, the C9800 range is ideal for workgroups doing high volumes.

Konica Minolta's bizhub C203/C353/C253 and C10 provide productivity and high-quality colour printing for everything from mid-size departments down to small offices. The C203/C353/C253 come with features such as online booklet making for professional-looking brochures and proposals. ITTE



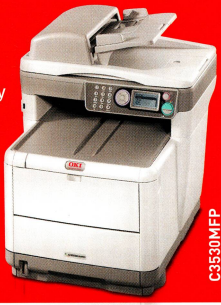


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# Why ADSL2+ is not the answer

**Widespread ADSL2+ is a step forward, but it's not the answer to Australia's broadband problems, argues *David Braue*.**

Telstra may finally be switching on its ADSL2+ services in over 900 exchanges around the country, but it had better be ready to handle the legions of disappointed customers who will find out that just because they're paying for ADSL2+ doesn't mean they're getting it.

The surprise announcement, which ended more than a year in which Telstra had flat-out refused to turn on the ADSL2+ equipment it had installed, was hailed by responsible minister Stephen Conroy as a step forward for Australian broadband — and it is, as long as there's less than about a kilometre of wire between you and your local Telstra exchange. Note that we're talking about wire, not distance; telecommunications cabling snakes its way under the streets and the actual length of the wire to your house can be nearly twice the physical distance.

This translates into ADSL2+ signal attenuation that means just one thing you need to care about: while Telstra will potentially be providing (and charging) more than two million homes for 20Mb/s services, many of those will be limping along at a tenth of the speed. My house, in a densely populated area 13km outside of Melbourne, is around 3km from the exchange but apparently has more than 4km of wiring (you can check your own situation, along with an estimate of the ADSL2+ speeds you can expect, at **www.adsl2exchanges.com.au**).

The best I can get is 2.9Mbit/s. If that doesn't sound like ADSL2+ to you, well, you're thinking like I am.

While Telstra has done something good by turning on these DSLAMs, it's only the beginning. ADSL2+ is just going to be a toe in the water; my own service would become far faster if there were a fibre-equipped node on a nearby street corner — which would mean my signal wouldn't attenuate much over the few hundred metres to the local node.

In the meantime, new ADSL2+ customers expecting an instant speed boost need to temper their expectations; there are still so many variables affecting performance that it's just not a guarantee of anything. Until the Fibre to the Node rollout gets underway, millions of customers, me included, just won't be getting what they paid for.

## in brief

### TURN YOUR MOBILE INTO A WI-FI ROUTER

A new mobile app turns your Nokia Series 60 phone into a Wi-Fi modem/router, removing the need for finicky Bluetooth or USB cable connections to laptops. Called JoikuSpot, the software allows the phone's 3G mobile connection to be shared via its inbuilt Wi-Fi antenna. As well as doing away with the need for a cable or Bluetooth connection, it also means a single 3G handset can provide high-speed internet access to groups of people. Just make sure you're on a grunty data plan for your mobile to avoid bill shock at the end of the month!

*Ian Grayson*



### DODO IN TROUBLE... AGAIN

Bargain-basement ISP Dodo, the subject of ongoing controversy over customer service and billing issues, has been directed to clean up its act by the Australian Communications and Media Authority. The communications regulator told Dodo it must comply with industry codes of practice relating to complaints-handling and billing. ACMA said if Dodo did not start complying, it faces civil penalties, such as financial damages in a possible customer class action.

*Dan Warne*

## your monthly broadband guide

*APC* is proud to partner with the independent broadband price-monitoring service Broadband Choice (***broadbandchoice.com.au***) to bring you the best ADSL and cable deals.

The comparison table on the following pages focuses on internet service providers that best serve the majority of *APC* readers' needs — those that have national coverage (though we have included some ISPs that provide higher than 2Mb/s speed services in limited areas).

Only those meeting at least three of our four plan selection criteria are listed:

**Budget plan:** cheapest deal under $35/month.

**Light plan:** cheapest deal under $60/month, with at least 512Kb/s speed and 1GB data.

**Family plan:** largest download allowance under $80/month, at least 512Kb/s and 10GB data.

**High-speed:** cheapest 1.5Mb/s plan under $100/month, with 10GB data minimum.

If an ISP has "unlimited downloads" but speed is throttled after reaching a certain limit, the portion in which you can get full-speed downloads is listed as its limit.

*APC* has picked the lowest price for a contract period of six months or less for broadband installation. Otherwise, the lowest-priced option was selected.

The installation price doesn't include a modem because you may find you'll get better value by buying one separately.

Can't find your provider in our list? That's because some of the largest ISPs, and many smaller ones, didn't meet the selection criteria. There may be ISPs we didn't list that will provide better deals (but which only service your local area or state).

ISPs enter their own information into the Broadband Choice database. ISPs can contact bc@whirlpool.net.au for more details on how to become part of the database.

Data for our table was extracted from the Broadband Choice database on 26 February 2007.

| Name | Online | Budget plan (under $35) | Light plan (under $60, at least 512Kb/s, minimum 1GB data limit) | Family plan (under $80, at least 512Kb/s, minimum 10GB data limit) | High-speed plan (under $100, at least 1.5Mb/s, minimum 10GB data limit) | National | Spam filtering | Setup fee and contract length | Rapid transfer |
|---|---|---|---|---|---|---|---|---|---|
| **Super-fast broadband ISPs (faster than 1.5Mb/s)** | | | | | | | | | |
| **aaNet ADSL2+** | www.aanet.com.au | $19.90† 1GB^ 24Mb/s | $39.90†* 8GB^ 24Mb/s | $49.90†* 16GB^ 24Mb/s | $79.90†* 32GB^ 24Mb/s | ✘ | ✘ | $119 12mths | ✘ |
| **AAPT LiveNet ADSL2+** | http://home.aapt.com.au | $29.95† 1GB^ 24Mb/s | $39.95† 5GB^ 24Mb/s | $59.95† 20GB^ 24Mb/s | N/A | ✘ | ✔ | $100 1mth | ✘ |
| **Aanix ADSL 2** | www.aanix.com.au | N/A | $44.95† 2GB+^ 24Mb/s | $59.95† 30GB+^ 24Mb/s | $59.95† 30GB+^ 24Mb/s | ✔ | ✔ | $155 12mths | ✔ |
| **BKB Home ADSL2+ Preferred** | www.bkb.net.au | N/A | $44.95† 10GB 24Mb/s | $59.95† 25GB 24Mb/s | $79.95† 40GB 24Mb/s | ✘ | ✔ | $89.95 12mths | ✘ |
| **BKB Home ADSL2+ Standard** | www.bkb.net.au | N/A | $59.95† 5GB 24Mb/s | $69.95† 15GB 24Mb/s | $99.95† 40GB 24Mb/s | ✘ | ✔ | $89.95 12mths | ✘ |
| **Blackstump ADSL2** | www.blackstump.net.au | N/A | $44.95† 20GB+ 2Mb/s | $59.95† 30GB+ 4Mb/s | $59.95† 30GB+ 4Mb/s | ✔ | ✔ | $129.95 12mths | ✔ |
| **Comcen ADSL2+** | www.comcen.com.au | $19.95† 1GB^ 24Mb/s | $39.95† 5GB+ 24Mb/s | $69.95† 40GB 24Mb/s | $69.95† 40GB 24Mb/s | ✘ | ✔ | $50 12mths | ✘ |
| **Comstech Systems ADSL2+** | www.comstech.com.au | N/A | $39.95† 5GB 24Mb/s | $66.95† 25GB 24Mb/s | $79.95† 40GB 24Mb/s | ✔ | ✔ | $102.95 12mths | ✔ |
| **CyberOne ADSL2+** | www.cyberone.com.au | $34.95† 4GB^ 24Mb/s | $49.95† 20GB+ 24Mb/s | $69.95† 30GB+ 24Mb/s | $69.95† 30GB+ 24Mb/s | ✔ | ✔ | $129 12mths | ✔ |
| **Dodo Super Fast ADSL2+** | www.dodo.com.au | $9.99†* 1GB+^ 24Mb/s | $29.99†* 5GB+^ 24Mb/s | $49.99†* 15GB+^ 24Mb/s | N/A | ✘ | $1.90 | $129.99 1mth | ✘ |
| **Dodo High Speed ADSL2+** | www.dodo.com.au | $29.99†* 1GB+^ 24Mb/s | $39.99†* 5GB+^ 24Mb/s | $59.99†* 15GB+^ 24Mb/s | N/A | ✘ | $1.90 | $129.99 1mth | ✘ |
| **Empcom ADSL2+** | www.empcom.net | N/A | $59.95 20GB 24Mb/s | $59.95 20GB 24Mb/s | $89.95 40GB 24Mb/s | ✘ | ✘ | $129 6mths | ✘ |
| **EscapeNet ADSL2+** | www.esc.net.au | $19.90† 500MB 24Mb/s | $39.90† 5GB 24Mb/s | $59.90† 25GB 24Mb/s | $89.90† 50GB 24Mb/s | ✔ | ✔ | $0 12mths | ✔ |
| **Green Tree Frog ADSL 2+ ULL** | www.greentreefrog.net.au | $29.95† 2GB 24Mb/s | $39.60† 5GB 24Mb/s | $66† 20GB 24Mb/s | $99† 40GB 24Mb/s | ✘ | ✔ | $0 12mths | ✘ |
| **iiNet broadband2+ ADSL (24Mbit)** | www.iinet.net.au | $29.95† 500MB+ 24Mb/s | $49.95† 7GB+ 24Mb/s | $69.95† 20GB+ 24Mb/s | $99.95† 40GB+ 24Mb/s | ✘ | ✔ | $79.95 6mths | ✘ |
| **ISP ADSL2+** | http://w3.isp.net.au | N/A | $36.30†* 16GB 24Mb/s | $69.30†* 42GB 24Mb/s | $69.30†* 42GB 24Mb/s | ✘ | ✔ | $145.65 6mths | ✘ |
| **Internode Extreme ADSL2+** | www.internode.on.net | N/A | $49.95 10GB 24Mb/s | $59.95 20GB 24Mb/s | $74.95 30GB 24Mb/s | ✘ | ✔ | $129 6mths | ✘ |
| **PrimusNET up to 8000Kbps** | www.iprimus.com.au | $29.95† 1GB 8Mb/s | $49.95† 5GB 8Mb/s | $69.95† 20GB 8Mb/s | $89.95† 40GB 8Mb/s | ✘ | $4 | $118 1mth | ✘ |
| **PrimusNET ADSL2+** | www.iprimus.com.au | $29.95† 1GB+ 24Mb/s | $49.95† 7GB+ 24Mb/s | $69.95† 12GB+ 24Mb/s | N/A | ✘ | $4 | $0 12mths | ✘ |
| **iSage ADSL 2** | www.isage.net.au | N/A | $44.95† 20GB+ 24Mb/s | $59.95† 30GB+ 24Mb/s | $59.95† 30GB+ 24Mb/s | ✔ | ✔ | $155 12mths | ✔ |
| **Koala Residential ADSL2+** | www.koalatelecom.com.au | N/A | $44.95† 5GB+ 24Mb/s | $69.95† 20GB+ 24Mb/s | $89.95† 30GB+ 24Mb/s | ✔ | ✔ | $149.95 6mths | ✘ |
| **Koala Usenet Dedicated** | www.koalatelecom.com.au | N/A | $49.95† 30GB 24Mb/s | $59.95† 50GB 24Mb/s | $49.95† 30GB 24Mb/s | ✔ | ✔ | $149.95 6mths | ✔ |
| **Letsgo Go ADSL2+ 20Mbit** | www.letsgo.com.au | N/A | $39.95† 15GB+ 24Mb/s | $59.95† 40GB+ 24Mb/s | $59.95† 40GB+ 24Mb/s | ✘ | ✔ | $99 12mths | ✘ |
| **Netspace Home ADSL2+** | www.netspace.net.au | $9.95†* 500MB 24Mb/s | $39.95† 5GB+ 24Mb/s | $69.95† 20GB+ 24Mb/s | $89.95† 30GB+ 24Mb/s | ✘ | ✔ | $99 6mths | ✘ |
| **Netspace 500/40 ADSL2+** | www.netspace.net.au | N/A | $49.95† 5GB 24Mb/s | $59.95† 10GB 24Mb/s | $99.95† 30GB 24Mb/s | ✘ | ✔ | $99 6mths | ✘ |
| **OptusNet Cable** | http://personal.optus.com.au | N/A | $59.99† 15GB^ 20Mb/s | $59.99† 15GB^ 20Mb/s | $99.99† 30GB^ 20Mb/s | ✘ | ✔ | $188 12mths | ✘ |
| **OptusNet DSL Direct** | http://personal.optus.com.au | N/A | $59.99† 15GB^ 24Mb/s | $59.99† 15GB^ 24Mb/s | $99.99† 30GB^ 24Mb/s | ✘ | ✔ | $188 12mths | ✘ |
| **Rabbit Net ADSL2+** | http://rabbit.com.au | $29.95†* 5GB 24Mb/s | $29.95†* 5GB 24Mb/s | $49.95†* 15GB 24Mb/s | $79.95†* 30GB 24Mb/s | ✘ | ✔ | $42.50 12mths | ✘ |
| **Soul ADSL2+** | http://https: | $34.95† 2GB+ 24Mb/s | $44.95† 5GB+ 24Mb/s | $69.95† 30GB+ 24Mb/s | $69.95† 30GB+ 24Mb/s | ✘ | ✔ | $119 12mths | ✘ |
| **Spin ADSL2+** | www.spin.net.au | $19.95† 1GB^ 24Mb/s | $39.95† 5GB+ 24Mb/s | $69.95† 40GB 24Mb/s | $69.95† 40GB 24Mb/s | ✘ | ✔ | $50 12mths | ✘ |
| **SuperNord ADSL2+ Broadband** | www.supernerd.com.au | $20† 1GB 24Mb/s | $30† 5GB 24Mb/s | $70† 45GB 24Mb/s | $60† 35GB 24Mb/s | ✔ | ✔ | $55 12mths | ✔ |
| **TPG Residential ADSL2+** | www.tpg.com.au | $29.99* 600MB 24Mb/s | $49.99 18GB+ 24Mb/s | $69.99 40GB+ 24Mb/s | $59.99 30GB+ 24Mb/s | ✘ | ✔ | $59.95 12mths | ✘ |
| **Vintek 20000k ADSL 2+** | www.vintek.net | N/A | $49.95 10GB 24Mb/s | $59.95 20GB 24Mb/s | $89.95 40GB 24Mb/s | ✘ | ✔ | $129 6mths | ✘ |
| **Westnet Broadband2+** | www.westnet.com.au | $29.95†* 500MB 24Mb/s | $49.95† 5GB+ 24Mb/s | $69.95† 10GB+ 24Mb/s | N/A | ✘ | $0.83 | $139 12mths | ✘ |
| **Regular broadband ISPs (1.5Mb/s or less)** | | | | | | | | | |
| **.Netcall ADSL (Bundled)** | www.netcall.com.au | $24.90†* 2GB+ 256Kb/s | $44.90†* 16GB+ 1.5Mb/s | $54.90†* 24GB+ 1.5Mb/s | $84.90†* 32GB+ 8Mb/s | ✔ | ✔ | $145 12mths | ✔ |
| **.Netcall ADSL (Unbundled)** | www.netcall.com.au | $29.90* 2GB+ 256Kb/s | $49.90* 16GB+ 1.5Mb/s | $59.90* 24GB+ 1.5Mb/s | $89.90* 32GB+ 8Mb/s | ✔ | ✔ | $145 12mths | ✔ |
| **aaNet ADSL (Bundled)** | www.aanet.com.au | $24.90†* 2GB+ 256Kb/s | $44.90†* 16GB+ 1.5Mb/s | $54.90†* 24GB+ 1.5Mb/s | $84.90†* 32GB+ 8Mb/s | ✔ | ✘ | $145 12mths | ✔ |

| Name | Online | Budget plan (under $35) | Light plan (under $60, at least 512Kb/s, minimum 1GB data limit) | Family plan (under $80, at least 512Kb/s, minimum 10GB data limit) | High-speed plan (under $100, at least 1.5Mb/s, minimum 10GB data limit) | National | Spam filtering | Setup fee and contract length | Rapid transfer |
|---|---|---|---|---|---|---|---|---|---|
| **Regular broadband ISPs (1.5Mb/s or less)** | | | | | | | | | |
| **aaNet ADSL (Unbundled)** | www.aanet.com.au | $29.90* 2GB+256Kb/s | $49.90* 16GB+1.5Mb/s | $59.90* 24GB+1.5Mb/s | $89.90* 32GB+8Mb/s | ✔ | ✘ | $145 12mths | ✔ |
| **AAPT Broadband** | http://home.aapt.com.au | $34.95† 1GB^256Kb/s | $59.95† 15GB^1.5Mb/s | $59.95† 15GB^1.5Mb/s | N/A | ✔ | ✔ | $100 1mth | ✔ |
| **ains Business Solo DSL** | www.ains.com.au | $31.95* 1GB 256Kb/s | N/A | $69.95* 15GB 1.5Mb/s | $82.95* 30GB 1.5Mb/s | ✔ | ✔ | $115 12mths | ✔ |
| **AuNix ADSL** | www.aunix.com.au | $29.95† 15GB 256Kb/s | $59.95† 20GB+1.5Mb/s | $59.95† 20GB+1.5Mb/s | $74.95† 35GB 1.5Mb/s | ✔ | ✔ | $99 6mths | ✔ |
| **Australia On Line ADSL** | www.australiaonline.net.au | $29.95 1GB+256Kb/s | $49.95 5GB 1.5Mb/s | $64.95 10GB 1.5Mb/s | N/A | ✔ | ✔ | $99 6mths | ✔ |
| **Australis Internet ADSL** | www.australis.net | $34.95 1GB 256Kb/s | $59.95 30GB+1.5Mb/s | $59.95 30GB+1.5Mb/s | $59.95 30GB+1.5Mb/s | ✔ | ✔ | $139 1mth | ✔ |
| **Beagle Internet ADSL** | www.beagle.com.au | $29.95 1GB 256Kb/s | $56.95 5GB 1.5Mb/s | $68.95 15GB 1.5Mb/s | $79.95 50GB 1.5Mb/s | ✔ | ✔ | $99.95 6mths | ✔ |
| **Blackstump ADSL Bundles** | www.blackstump.net.au | $34.95†* 500MB 512Kb/s | $57.95† 5GB 1.5Mb/s | $69.95† 15GB 1.5Mb/s | $79.95† 50GB 1.5Mb/s | ✔ | ✔ | $108 6mths | ✔ |
| **BBI Flat Rate DSL** | www.brownbear.net.au | $32.95 2GB 256Kb/s | $56.95 5GB 1.5Mb/s | $69.95 25GB 1.5Mb/s | $79.95 35GB 1.5Mb/s | ✔ | ✔ | $119 6mths | ✔ |
| **BBI Excess DSL** | www.brownbear.net.au | $32.95* 2GB 256Kb/s | $56.95* 5GB 1.5Mb/s | $69.95* 25GB 1.5Mb/s | $79.95* 35GB 1.5Mb/s | ✔ | ✔ | $119 6mths | ✔ |
| **Brown Bear DSL/ Phone** | www.brownbear.net.au | $19.95†* 1GB 256Kb/s | $54.95† 5GB 1.5Mb/s | $64.95† 25GB 1.5Mb/s | $74.95† 35GB 1.5Mb/s | ✔ | ✔ | $119 6mths | ✔ |
| **Chariot ADSL** | www.chariot.net.au | $29.95 1GB 256Kb/s | $49.95 10GB 1.5Mb/s | $69.95 25GB 1.5Mb/s | $79.95 40GB 1.5Mb/s | ✔ | ✔ | $110 6mths | ✔ |
| **Comcen Internet ADSL** | www.comcen.com.au | $29.95† 10GB 256Kb/s | $44.95†* 5GB+1.5Mb/s | $69.95† 20GB+1.5Mb/s | $99.95† 30GB+1.5Mb/s | ✔ | ✔ | $99 6mths | ✔ |
| **Concept Networks ADSL** | www.conceptual.net.au | $29.95* 500MB 256Kb/s | $59.95* 5GB 1.5Mb/s | $69.95* 15GB 1.5Mb/s | $89.95 30GB 1.5Mb/s | ✔ | ✔ | $99 6mths | ✔ |
| **Data Oz Residential ADSL** | www.dataozsolutions.com.au | $34.95 2.5GB+256Kb/s | $49.95 5GB+1.5Mb/s | $64.95 15GB+1.5Mb/s | $84.95 30GB+1.5Mb/s | ✔ | ✔ | $159.95 6mths | ✔ |
| **Dinkum Internet ADSL** | www.dinkum.net.au | $34.95 1GB 256Kb/s | $59.95 5GB 1.5Mb/s | $69.95 15GB 1.5Mb/s | $89.95 50GB 1.5Mb/s | ✔ | ✔ | $129 6mths | ✔ |
| **Dodo ADSL** | www.dodo.com.au | $19.99†* 500MB+^ 256Kb/s | $39.99†* 5GB+^ 1.5Mb/s | $59.99†* 15GB+^ 1.5Mb/s | N/A | ✔ | $1.90 | $129.99 1mth | ✔ |
| **DragNet ADSL** | www.dragnet.com.au | $29.95 1GB 256Kb/s | $59.95 5GB 1.5Mb/s | $68.95 15GB 1.5Mb/s | N/A | ✔ | ✔ | $119 6mths | ✔ |
| **Ecomtel ADSL** | www.ecomtel.com.au | $19.90† 500MB 256Kb/s | $39.90† 5GB 1.5Mb/s | $54.90† 20GB 1.5Mb/s | $74.90† 40GB 1.5Mb/s | ✔ | ✔ | $120 6mths | ✔ |
| **EFTel ADSL** | http://w3.eftel.com | $19.95†* 500MB 256Kb/s | $59.95†* 7GB 1.5Mb/s | $69.95†* 25GB+1.5Mb/s | N/A | ✔ | ✔ | $125 12mths | ✔ |
| **EscapeNET ADSL Home** | www.esc.net.au | $29.90 500MB 256Kb/s | $49.90 5GB 1.5Mb/s | $69.90 25GB 1.5Mb/s | $99.90 50GB 1.5Mb/s | ✔ | ✔ | $99 6mths | ✔ |
| **eTelecom ADSL** | www.etelecom.com.au | $29.95†* 1GB 256Kb/s | $59.95†* 5GB 1.5Mb/s | $69.95†* 15GB 1.5Mb/s | N/A | ✔ | ✔ | $99 12mths | ✔ |
| **Green Tree Frog ADSL** | www.greentreefrog.net.au | $33† 5GB 256Kb/s | $55† 10GB 1.5Mb/s | $55† 10GB 1.5Mb/s | $82.50† 40GB 1.5Mb/s | ✔ | ✔ | $132 6mths | ✔ |
| **Hotkey Internet ADSL** | www.hotkey.net.au | $34.95* 1GB 1.5Mb/s | $44.95* 5GB 1.5Mb/s | $69.95 12GB 1.5Mb/s | N/A | ✔ | ✔ | | ✔ |
| **ISP ADSL** | http://w3.isp.net.au | $33* 3GB 256Kb/s | N/A | $69.30* 25GB 1.5Mb/s | $88* 30GB 8Mb/s | ✔ | ✔ | $132 6mths | ✔ |
| **Internode Home ADSL** | www.internode.on.net | N/A | $49.95 5GB 1.5Mb/s | $69.95 20GB 1.5Mb/s | $84.95 30GB 1.5Mb/s | ✔ | ✔ | $129 6mths | ✔ |
| **Primus Flexible Broadband** | www.iprimus.com.au | $24.95† 500MB 256Kb/s | $54.95† 5GB 1.5Mb/s | $69.95† 20GB 1.5Mb/s | N/A | ✔ | $4 | $118 1mth | ✔ |
| **iSage Internet ADSL** | www.isage.net.au | $34.95 15GB+256Kb/s | $59.95† 20GB+1.5Mb/s | $59.95† 20GB+1.5Mb/s | $79.95 35GB+1.5Mb/s | ✔ | ✔ | $99 6mths | ✔ |
| **iTEL ADSL** | www.itel.net | $29.95†* 500MB 256Kb/s | $59.95†* 5GB 1.5Mb/s | N/A | $79.95† 60GB 1.5Mb/s | ✔ | ✔ | $129 12mths | ✔ |
| **Koala Residential ADSL1** | www.koalatelecom.com.au | $34.95† 2.5GB+256Kb/s | $49.95† 5GB+1.5Mb/s | $69.95† 15GB+1.5Mb/s | $89.95† 30GB+1.5Mb/s | ✔ | ✔ | $149.95 6mths | ✔ |
| **Koala Business ADSL1** | www.koalatelecom.com.au | $34.95†* 2GB+512Kb/s | $49.95†* 7GB+1.5Mb/s | $59.95†* 15GB+1.5Mb/s | $79.95†* 30GB+1.5Mb/s | ✔ | ✔ | $149.95 6mths | ✔ |
| **Lizzy ADSL** | www.lizzy.com.au | $29.95 1GB+256Kb/s | $49.95 5GB 1.5Mb/s | $64.95 10GB 1.5Mb/s | N/A | ✔ | ✔ | $99 6mths | ✔ |
| **Netspace Home ADSL** | www.netspace.net.au | $29.95† 10GB+256Kb/s | $39.95† 5GB+1.5Mb/s | $69.95† 20GB+1.5Mb/s | $99.95† 30GB+1.5Mb/s | ✔ | ✔ | $99 6mths | ✔ |
| **NetSpeed ADSL** | www.netspeed.com.au | $29.95†* 1GB+256Kb/s | $54.95†* 5GB+1.5Mb/s | $64†* 10GB+1.5Mb/s | N/A | ✔ | $2 | $139 12mths | ✔ |
| **Pacnet Express DSL** | www.pacific.net.au | $29.95† 3GB 256Kb/s | $49.95 5GB 1.5Mb/s | $49.95† 10GB 1.5Mb/s | N/A | ✔ | ✔ | $99 6mths | ✔ |
| **Rabbit Net ADSL** | http://rabbit.com.au | $28.95†* 500MB 256Kb/s | $58†* 5GB 1.5Mb/s | $70†* 30GB 1.5Mb/s | $70†* 30GB 1.5Mb/s | ✔ | ✔ | $104.50 6mths | ✔ |
| **Soul ADSL** | http://https: | $29.95 No limit 256Kb/s | $59.95† 10GB+1.5Mb/s | $59.95† 10GB+1.5Mb/s | N/A | ✔ | ✔ | $119 12mths | ✔ |
| **Spin Internet** | www.spin.net.au | $29.95† 10GB 256Kb/s | $44.95†* 5GB+1.5Mb/s | $69.95† 20GB+1.5Mb/s | $99.95† 30GB+1.5Mb/s | ✔ | ✔ | $99 6mths | ✔ |
| **SuperNerd ADSL1 Broadband** | www.supernerd.com.au | $26.95 1GB 256Kb/s | $59.95 15GB 1.5Mb/s | $59.95 15GB 1.5Mb/s | $72.95 30GB 1.5Mb/s | ✔ | ✔ | $90 6mths | ✔ |
| **TSN Broadband - Without Fixed Term Contracts** | www.tsninternet.com.au | $32.95 1GB^256Kb/s | $49.95 5GB^1.5Mb/s | $69.95 20GB^1.5Mb/s | $99.95 40GB^1.5Mb/s | ✔ | $1.95 | $99 1mth | ✔ |
| **Vintek Personal ADSL** | www.vintek.net | N/A | $49.95 5GB 1.5Mb/s | $69.95 20GB 1.5Mb/s | $99.95 40GB 1.5Mb/s | ✔ | ✔ | $129 6mths | ✔ |
| **Water Sprite ADSL1 Shaped plans** | www.watersprite.net.au | $35 2GB 256Kb/s | $60 5GB 1.5Mb/s | $70 15GB 1.5Mb/s | $84 35GB 1.5Mb/s | ✔ | ✔ | $150 6mths | ✔ |
| **Water Sprite ADSL1 Excess charged plans** | www.watersprite.net.au | $35* 2GB 256Kb/s | $60* 5GB 1.5Mb/s | $70* 15GB 1.5Mb/s | $84* 35GB 1.5Mb/s | ✔ | ✔ | $150 6mths | ✔ |
| **Westnet Broadband1** | www.westnet.com.au | $29.95† 500MB 256Kb/s | $59.95† 10GB+1.5Mb/s | $69.95† 20GB+1.5Mb/s | $99.95† 40GB+1.5Mb/s | ✔ | $0.83 | $99 6mths | ✔ |

*Key: * ISP charges excess usage fees when you exceed your download limit; † This price only available if bundled with long distance telephony from the ISP; ^ Additional download allowance available with this plan for use in off-peak periods; ^ ISP confirmed sent and received data when calculating usage.*



# Fixing Vista

**Vista launched over a year ago with the slogan, 'The Wow is Now'. But less than one fifth of you have it installed, so *Simon Bisson* asks where is the wow now?**

Vista has certainly had a mixed reception. Many users complain of reduced performance and an inconsistent user interface. And there are plenty of grounds for disappointment, especially as Microsoft failed to give us the promised Longhorn. It's also had significant competition from Windows XP, which has remained the steadfast OS for many users — new and old.

In the light of a slew of Vista fixes with the release of its first Service Pack, it's time we fully judged whether our initial optimism about Microsoft's new operating system was justified. A year is a good length of time to get to grips with the strengths and weaknesses of a new OS and to get a feel for the good, the bad and the SP1.

Windows Vista finally came out of its long beta program and, after almost six years since its predecessor's introduction, the consumer product release came in January 2007. But in reality, Vista went straight back into another test program, as businesses and consumers judged their misgivings and decided that XP was a strong enough operating system for everything they were doing. And that wasn't just the standard response to a new software release: over a year on and people still opt for XP over the now apparently mature Vista operating system. Despite Microsoft's expensive 'Wow' branding, it turned out that there wasn't that much of a wow in Vista after all, at least not enough to get the vast majority of users to upgrade from the old faithful.

When it comes to Vista sales, what you hear depends very much on who's said it. Microsoft has been very bullish about Vista's sales figures. It's clear that Vista's sales numbers compare well with XP's, but the problem is it's not really an apples-to-apples comparison — the commercial and consumer PC market was a lot bigger in 2007 than it was in 2003. Microsoft can quite rightly point to impressive sales numbers (and to the effect they've had on the company's balance sheet), while analysts can point to slow enterprise sales and to low upgrade figures. Microsoft's hefty Vista marketing spend hasn't had the impact of Apple's PC versus Mac advertising campaign. Even so, there are now a lot of copies of Vista out there, and a lot of people who still haven't swapped it for its biggest competitor, Windows XP.

One reason why Vista is selling is its increased driver support. Microsoft has worked hard to get drivers developed for the most popular devices, and it's using the Windows Update service to gather information on what devices don't have working drivers — and then encouraging vendors to develop appropriate ones. We've noticed several pieces of hardware we thought would never have Vista support suddenly download competent drivers. Important kernel changes in Vista also mean that it's now extremely stable. Microsoft has removed the original graphics subsystem from the kernel and added a window manager — so crashed applications no longer hang the whole system, and a graphics driver crash just results in a black screen for a couple of seconds while the OS independently reloads the driver, system intact.

While capably managing third-party drivers can seem impressive, there's far more required of a modern operating system these days. Rather than focusing its efforts on its web app propositions, Microsoft needs to concentrate on its core foundation of users — otherwise it could find Apple and Linux competitors steal some very solid ground.

> MICROSOFT'S HEFTY VISTA MARKETING HASN'T HAD THE IMPACT OF APPLE'S PC VERSUS MAC ADVERTISING CAMPAIGN

### INTEGRATED SOFTWARE

Vista's bundled applications felt, well, unfinished. Yes, they were an improvement on XP's bundled tools, but Apple's iLife and iWork have set the bar much higher than Microsoft may have liked. Luckily for Vista, the Windows Live team have produced new versions of Microsoft's consumer tools, versions that take advantage of both Vista and the Live web services platform. Vista's Gallery has had a makeover with Windows Live Gallery, which adds improved image editing tools (including panorama stitching) and links to online services such as Windows Live Spaces and Yahoo!'s popular Flickr image hosting service. Windows Live Mail Desktop also brings back features that had been lost in the transition from Outlook Express to Windows Mail, and adds an RSS reader.

Microsoft hasn't stopped developing Vista in the year since it launched, fixing many of its little niggles and annoyances with performance and reliability updates that have been pushed out through Windows Update throughout the year. While XP introduced Windows Update as a key Windows feature, it's Vista that's really



# Vista Service Pack 1

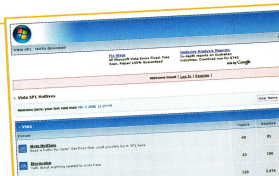
## QUICK DOWNLOAD 65Mb FILE

**The quickest way to obtain Vista Service Pack 1 is by internet download — this minimises the size of the SP1 file by sending only the changes needed by the Vista installation on your computer.**

**This will typically be a 65Mb download. On an ADSL connection it will take just a few minutes.**

**www.microsoft.com/download**

**If you don't download it now, SP1 will be made available to customers using Vista automatic download capability in mid April. It will also be made available to those purchasing full boxed product in mid April. A disc-based version of Vista SP1 will also be made available but this can take up to 7GB on a hard disk as it needs to contain multiple language versions of the update.**



taken advantage of its ability to keep the OS up to date. Microsoft is not only using it to ship out OS updates, it's now become a tool to keep key drivers as current as possible — especially third-party networking and graphics drivers, which were notoriously poor in the early days of Vista. Some of the updates fix well-known problems — including Vista's painfully slow file copy and network performance.

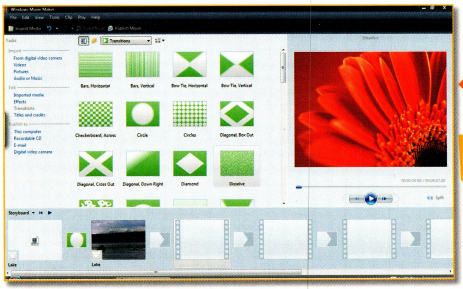
Relying on Windows Update for fixes is both a plus and a minus for Vista. Broadband connections make it easier to use Windows Update, but automated 3am reboots can wipe out unsaved work. If you're using Vista make sure that you've set up Windows Update to notify you of available updates — and then make sure that you install them when your schedule permits. Updating should be a lot easier once Vista SP1 comes out, as it will finally give Windows hot-updates — updates that can be installed without forcing a reboot.

### THE 2007 DESIGN

One of Vista's biggest problems — but also one of its biggest plus points — was that it was designed for hardware that was going to ship in 2007. There's a big performance difference between Vista running on a single-core Athlon from 2006 and on a dual-core Santa Rosa notebook. Unlike XP, Vista requires plenty of memory and gets the most from multi-core processors. Both Intel and AMD have launched powerful dual- and quad-core CPUs, and memory prices have dropped considerably.

One group of users who've seen definite benefits from Vista are mobile users, with Intel's latest Santa Rosa laptop platform giving Vista-loaded laptops an edge they definitely needed. Vista's Mobility Centre gives laptop users a one-stop control panel for mobility features — and it's easy to switch into a presentation mode, which hides personalised features and prevents embarrassing pop-ups from email and IM. One mobile feature for the Enterprise and Ultimate user that makes a lot of sense — especially after the government lost millions of personal records in the post — is Bitlocker, which gives Vista whole drive encryption tools that make it very hard to extract data from a stolen laptop.

The biggest problem facing Vista is the success of Windows XP. However, another issue comes straight out of the Vista family: Windows Vista Home Basic. Barely Vista at all, sheared of most of the Aero bells and whistles, it was intended to be a starter version that could be upgraded online to Home Premium or Ultimate. However, when combined with Microsoft's poorly thought out Vista Ready branding,

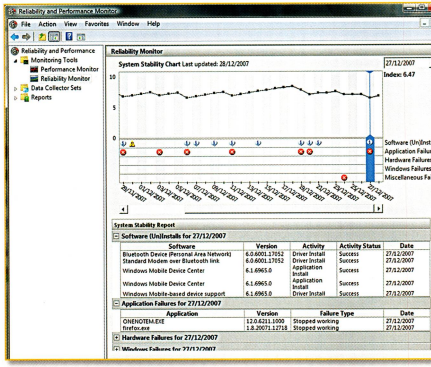


**Want high-definition capabilities on Vista? Look no further than Movie Maker, which allows you to create your own HD movies to share with friends and family.**

## FACT FILE!

**Microsoft security guru Jeff Jones keeps an operating system vulnerability score card on his blog, comparing Vista to other operating systems. One interesting number from a recent entry is that Windows Defender on Vista is reporting 2.8 times less unwanted software than on Windows XP SP2. (*http://blogs.technet.com/security/*).**

# Vista's rescue squad arrives




**Having problems with your Vista PC? The built-in Reliability Monitor can help pinpoint what's causing software (and hardware) problems.**

it left many first-time buyers unhappy and unsatisfied. What happens next here is up to the lawyers, as a legal case in the US has turned into a class action suit, suing Microsoft for false advertising.

Certainly we wouldn't recommend buying Home Basic. Home Premium isn't that much more expensive (especially at OEM prices) and it's much more capable. Even so, don't expect it to run perfectly on your old XP hardware, and make sure you back up everything before you attempt an upgrade install.

## NEW TECHNOLOGIES

Vista introduced a new look-and-feel for Windows applications, with its Aero user interface scheme. However, it's a big change only partly done, making the regular appearance of dialog boxes that haven't changed since Windows 95 somewhat jarring. It's not as big a change as Office's, but it's still one that makes many users uncomfortable. Familiar key combinations have been changed, and Microsoft hasn't provided any way of learning about the new options. Adobe's new Photoshop release changed the user interface, but Adobe gave users the option of highlighting the changes — making it easier to learn the new features and the new keyboard

> MICROSOFT HOLDS REGULAR PLUGFESTS FOR DEVICE DRIVER DEVELOPERS, AND IT'S CLEAR 64-BIT IS THE LONG-TERM FUTURE

# Vista SP1 up to 86% faster in some tests

**VISTA SERVICE PACK 1 MAKES A MASSIVE DIFFERENCE TO THE FILE COPYING SPEED OF VISTA. *APC*'S JAMES BANNAN BENCHMARKED VISTA WITH SP1 AND CAME UP WITH INTERESTING RESULTS.**

Although Vista SP1 has many documented improvements, we aimed to test a scenario which has proved to be a major problem for pre-SP1 users: file copy performance, particularly over a network. The aim of these single file and multi file tests was to see how changes in the test machine's patch level affected performance.

Our main client system was an Acer Veriton 7900 Pro (Intel Core 2 Duo 6700/4GB RAM/ATI RADEON X1950/2xSATA-II HDD) running Windows Vista Home Premium, connected via a dedicated Gigabit network to two remote systems — one also running Windows Vista Home Premium, the other running a fully-patched Windows XP SP2 installation.

The tests were run three times – once with Vista Home Premium RTM, once with all the available patches applied from Windows Update, and once with SP1 RTM applied. The remote Vista system was also patched to maintain consistency between it and the test machine. The XP system was unchanged.

We used two test file batches – the first was a single 2.5GB ISO, and the second was 2.5GB of small files (over 300 MP3s). Each file batch was copied to a remote destination (write), and then written back across the wire to the test system (read/write).

## PCMARK VANTAGE

PCMark Vantage essentially tests system hardware performance. Overall PCMark results jumped 12.8% from RTM to RTM Patched — quite an increase. But moving to SP1 demonstrated general improvements across the board. The overall score was 1.5% higher than RTM patched and 14.5% higher than RTM.

Graphics and multimedia performance demonstrated consistent improvements across the tests, but the gaming benchmarks demonstrated a very slight decline of 0.2% compared with RTM. PCMark's gaming benchmarks are very sensitive to driver performance (especially graphics drivers) and the version of ATI Catalyst installed isn't configured to take advantage of Vista SP1.

## DISK-TO-DISK FILE COPY

In RTM there was an initial difference of up to 12 seconds between the single file and multi-file tests, but this variation was largely eradicated in the SP1 performance data, with the tests producing almost identical results.

## DISK-TO-USB FILE COPY

These results produced an interesting trend between the two tests. The test results were exactly the same in RTM, but the write test data started to deviate in RTM Patched and were almost a minute apart in SP1 in favour of the single file test. Multi-file write times under SP1 were actually worse than RTM/RTM Patched, whereas single file write times improved significantly. This was reported to Microsoft, who reported it was not an expected result. The data has been submitted for further examination. In both cases, the writeback test improved marginally with SP1.

## VISTA-TO-XP FILE COPY

Given the problems that have dogged Vista in the realm of XP/2003 networking, this was the area we expected to see the greatest improvements, and we weren't disappointed. There was almost no variation in the test results between RTM and RTM Patched, but with SP1 the improvements were astounding.



Nvidia's Cascades DirectX 10 demo shows off Vista's gaming capabilities.

# DirectX 10 VISTA'S NOT-SO-SECRET WEAPON

**Windows Vista introduced a new version of Microsoft's multimedia API, DirectX 10. It's exclusive to Vista, as it relies on the changes that Microsoft has made to Vista's graphics architecture and is linked to Vista's desktop window manager.**

**DirectX isn't just used for games, and Vista uses the DirectX 10 API to drive its Aero user interface. However, it's games that can take the most advantage of DirectX 10's features — including new 3D renders and shaders. This means it can deliver much more realistic images, as Microsoft has already shown with its flagship Flight Simulator.**

**As a result, Vista has become the home for high-end Windows games, such as the popular BioShock and Gears of War. While Microsoft is pushing DirectX 10 as a reason for upgrading to Vista, not every Vista-specific game requires DirectX 10. Some, such as Halo 2, use other gaming-oriented Vista features that allow a game to be played while it's still loading.**

**Microsoft is planning to ship a new version of DirectX 10, 10.1, with Vista SP1. It will work with existing DirectX 10 hardware but its image processing features will need specific DirectX 10.1 hardware. While XP is still popular, it looks as though 2008 could be the year that Vista becomes the gaming platform of choice.**

shortcuts. That's a step that Microsoft missed out with Vista — even though it did something similar for Office users.

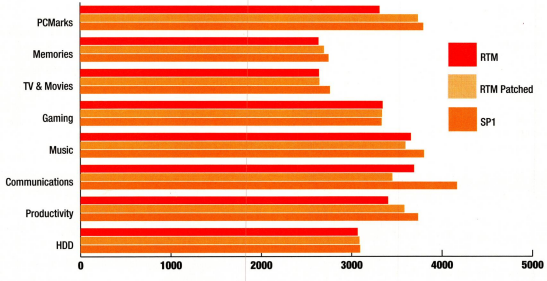
One area where Microsoft hasn't given Vista the attention it needs is the Sidebar, not to mention its Gadgets. There's been very little support from Microsoft, and the online Sidebar Gallery makes it hard to find the tools you need. The Sidebar could be one of Vista's most useful features, giving you a single place to find the online information you want. Instead it's become a neglected slum that's often turned off to recover screen real estate and save processing power. Vista's Sideshow displays have also fallen by the wayside, with limited hardware support apart from a few laptops. It's a technology that sounded interesting at first, but in practice doesn't seem that useful — especially when it's competing with the smartphone.

## CUMBERSOME SECURITY

One Vista tip that's proved popular all year has been just how to turn off those perennial UAC uplift prompts. Microsoft's switch away from administrator accounts has made it difficult to work with software that requires administrative rights to operate, and the UAC pop-up has proven particularly annoying. Was it something you did that popped up the UAC prompt, or was it a piece of malware? There's very little information in the UAC dialog box, and very little way of working out just why you're clicking OK — did you just launch a copy of Eclipse, or have you accidentally installed some spyware? Turning off UAC isn't any help — all it does is reduce Vista's security level to that of XP (and at the same time removes Internet Explorer 7 from its secure low-privilege sandbox).

One thing that UAC reveals is how rarely you need full administrative rights on a Windows machine. Once you've got your system configured and your software set up and running, UAC prompts are very rare — only appearing when you're installing new software or tuning operating system functions.

UAC isn't the only security tool built into Vista, and it's certainly not the most user-hostile. Vista's built-in DRM capabilities have rightly come under scrutiny, especially as there appears to be a move away from DRM in some circles. Microsoft has put hooks in Vista to allow content

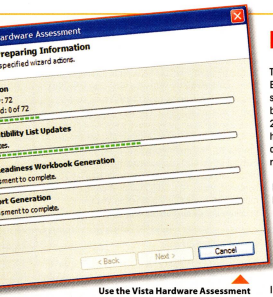



**The single file write test dropped from just under nine minutes to less than two — a 77% improvement — while the writeback test dropped from 9:33 to just over a minute — an 86% improvement. The results in the multi-file tests were equally impressive, improving by 64% and 83% respectively. The variation between the tests on RTM was almost completely ironed out in SP1.**

## VISTA-TO-VISTA FILE COPY

**While the overall performance times were good, they worsened across the board from RTM to RTM Patched by a factor of two to five seconds. However, this was all resolved in SP1, where test results were six to 14 seconds better than RTM, with the notable exception of the single file writeback test, which was a substantial 21 seconds slower than RTM. The changes to the file copy algorithm introduced in Windows Vista were designed to remedy a number of problems with the algorithm used in Windows XP, but the new algorithm suffers from a number of drawbacks on network file copy. The reasons are complex and are outlined in full at *apcmag.com*.**

# Vista's rescue squad arrives




**Use the Vista Hardware Assessment tool to see if your network is Vista-ready.**

## Ready for business VISTA'S NOT JUST FOR HOME

**The first versions of Vista to leave Redmond were the Business and Enterprise editions. Uptake has been slow, something that may be the result of many businesses completing their Windows XP roll-outs in 2005 and 2006. With a four-year upgrade cycle for hardware and software becoming increasingly commo,n we're unlikely to see significant business roll-outs of Vista until late 2008 and 2009.**

As Vista is built on the Windows Server 2003 kernel, it's not surprising that it contains many business-centric features. It's a lot easier to manage the fine details of a user's PC remotely, though system management tools are only just starting to support Vista's 700 or so extra policy options.

Improved security features such as Bitlocker are important, but it's Vista's new deployment tools that should show a quick return on investment. Instead of managing an operating system image for every piece of hardware, system managers can take advantage of Vista's Windows Image to have a single image that can be used for every machine in their network, saving a lot of management time.

Microsoft's Vista Hardware Assessment tool is designed to help network administrators build an inventory of the computers on their network and then test to see if they are compatible with Vista upgrades. This is an agentless tool, so it can be run without deploying clients to every machine on the network. It will also help you find the device drivers you'll need to build your WIM (Windows Imaging Format) installation image.

If you're using Microsoft's Software Assurance, you'll get access to the Desktop Optimisation Pack, which adds tools to help manage applications and keep track of any changes you have made to group policies.

providers to mandate a secure digital path from any media source to the screen. This has made it difficult for Vista to support high-end audio software, as well as adding a processing overhead to Vista's media tools. While it's nowhere near as bad as some scare-mongering stories would have it, Vista's DRM isn't the best of ideas — and it's one that potential users hear about, and worry about, before they even consider purchasing Vista. One thing's sure: Microsoft would be better off removing this 'feature' from Vista sooner rather than later.

### THE MISSING BITS

Vista went through a long gestation process — with a complete restart in 2004. The infamous Longhorn Reset left a large number of Longhorn's promised features by the wayside, along with many of the planned user interface enhancements. What we call Aero isn't the version developers were shown at Microsoft's Longhorn announcement at its 2003 Professional Developers Conference. Microsoft started out promising a true 3D vector user interface based on its Windows Presentation Foundation (then codenamed Avalon), which was going to be developed in XAML and powered by .NET. Instead we're left with a version of the old Windows user interface that's been skinned with Aero-like transparent widgets, handled by a new window manager that adds another layer of complexity to Windows — and which requires a hefty graphics card for full effect.

The original Aero user interface isn't the only casualty of the Longhorn restart. Microsoft's been promising an object-oriented file system with full query capabilities since Chicago — the codename for the project that became Windows 95. More than twelve years down the line we're still no closer, as the promised third leg of the Longhorn tripod, WinFS, first became a future add-on for Vista, and then vanished into a future version of SQL Server. Vista may have a souped-up version of Microsoft's desktop search tools built-in, but that's not the promised ability to build virtual folders of stacked documents that would automatically update as new documents were created.

The Ultimate Edition of Vista has also suffered from disappearing components. The promised regularly updated list of Ultimate-only Vista extensions has become a set of tools for Bitlocker, a Texas-Hold'em game, an animated screen background and a set of language packs. Bill Gates' keynote at CES in early 2007 showed off a promised image editing Ultimate Extra from Microsoft Research — but that was written off a few days later as only a demo of what might

## FACT FILE!

**If you're using (or thinking of using) Windows Vista, then it's well worth keeping an eye on the Vista team blog. It may not update as often as we'd like, but there's plenty of content and pointers to useful Vista updates: *http://tinyurl.com/2hdxyz*.**


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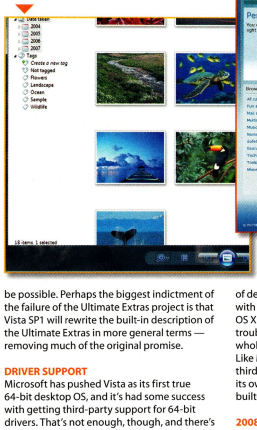
Test for free: www.hello-engines.com

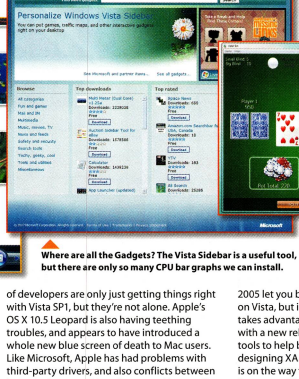



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**Why not ditch Vista's Gallery for the Windows Live Photo Gallery? It adds more features and Flickr upload capability.**




**The promised Windows Ultimate Extras haven't appeared, apart from a handful of tools and a poker game.**




**Where are all the Gadgets? The Vista Sidebar is a useful tool, but there are only so many CPU bar graphs we can install.**

be possible. Perhaps the biggest indictment of the failure of the Ultimate Extras project is that Vista SP1 will rewrite the built-in description of the Ultimate Extras in more general terms — removing much of the original promise.

## DRIVER SUPPORT

Microsoft has pushed Vista as its first true 64-bit desktop OS, and it's had some success with getting third-party support for 64-bit drivers. That's not enough, though, and there's plenty of common hardware that doesn't come with 64-bit support. While Microsoft writes all its code so that it compiles as both 32- and 64-bit, things aren't so easy for hardware manufacturers.

Different driver models for the different versions of Vista mean they're effectively supporting two different operating systems, one of which is much more popular than the other. It's no wonder that immature 64-bit drivers leave users with the unpleasant sight of yet another blue screen of death. Even so, we'd expect more of an effort on the hardware manufacturers' parts. Microsoft holds regular plugfests for device driver developers, and it's more than clear that 64-bit is the long-term future of Windows.

Sadly, despite Microsoft's driver program, there are still many 32-bit devices that haven't — and probably will never have — any Vista drivers. Microsoft has done a lot to encourage Vista driver development, but, like XP before it, many hardware vendors have decided to use the release of a new operating system to end the life of devices they just don't want to support any more. Even so, we're still surprised that the Vista drivers for some popular graphics cards don't have all the features of their XP equivalents.

Perhaps building a modern operating system is just too hard. Microsoft's thousands of developers are only just getting things right with Vista SP1, but they're not alone. Apple's OS X 10.5 Leopard is also having teething troubles, and appears to have introduced a whole new blue screen of death to Mac users. Like Microsoft, Apple has had problems with third-party drivers, and also conflicts between its own photographic software and Leopard's built-in Time Machine back-up application.

## 2008: VISTA'S YEAR?

Year Two promises something very different, with the arrival of Vista's first service pack. Vista SP1 looks set to fix many of Vista's underlying problems — though it won't take away UAC. We've been using it for some time now, installing various betas. SP1 certainly makes Vista more stable, and it also makes it more compatible with the upcoming Windows Server 2008 release. With SP1 due out of Redmond's doors in the New Year, it's probably worth giving Vista another look. Microsoft's long list of changes and updates is most welcome, though it's still got XP's final service pack as competition.

The real driver for Vista adoption isn't a service pack — it's Vista-specific applications. They've been a long time coming, and that's because Microsoft has only just released its first Vista development tool. Updates to Visual Studio 2005 let you build applications that would run on Vista, but it's Visual Studio 2008 that really takes advantage of Vista's new user interface, with a new release of the .NET framework and tools to help build WPF applications — including designing XAML controls. A new version of .NET is on the way that will add even more tools and features to Vista.

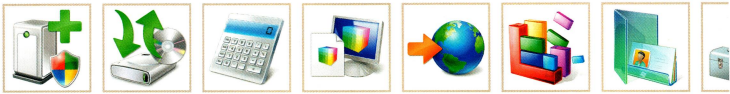
However, while Microsoft has touted Vista as the most secure Windows yet, its slow uptake has meant that it's still a small proportion of the total install base. That's meant it's not become a significant attack vector for malware, with much of the Vista malware being purely the fallout of attacks on XP. There may be more Vista PCs out there than OS X, but that's still many fewer than the number of XP machines connected to the internet. Things should change in 2008, as Vista uptake is expected to grow, quickly passing 10 per cent of the total world installed base. That's a significant percentage, as it will make Vista more attractive to malware authors. It's going to be a while before we see if Vista's built-in defences mean it's safer than its predecessors.

One area where Vista will come to the fore in 2008 is as a tool for creating and managing HD content. With HD video recorders becoming more common, Vista's built-in HD capabilities will mean you'll be able to make and share HD videos with friends and family. HD DVD or Blu-ray drivers are still missing from Vista, though Toshiba is bundling HD DVD burners with its latest notebook PCs.

The biggest problem facing Vista in Year Two is Windows XP. Not only is it getting a speed bump with the release of its third service pack, but it's still good enough for most everyday operations (and Office 2007 runs happily on XP). Microsoft will end OEM installs of XP sometime in 2008: the only way that the new kid will gain an edge over its more mature sibling. **BITTR**

## FACT FILE!

**Like Vista's landscape screen wallpaper? Hamid Darwish, a photographer who produced two of the images used in the wallpaper collection, has put the rest of the images he shot for Microsoft online, in hefty high-resolution formats. Download them from *www.hamaddarwish.com/vista.html*.**



# Windows Se

**Windows Server 2008 finally makes Vista a serious OS for businesses and delivers a massively improved Microsoft server platform. But is there anything to tempt the Linux crowd? *James Bannan* and *David Braue* take a serious look at the new server OS.**

Just released, Windows Server 2008 is the much-anticipated Microsoft Server OS that brings a swathe of enhancements to the Window Server product range. It has generated a lot of industry interest — new features like Hyper-V virtualisation and Server Core are redefining the classic role of Window Server, and IT managers now have a better opportunity to implement advanced projects without recourse to third-party products.

But who really needs (or wants) Windows Server 2008? While it certainly stands up on its own two feet as a solid product, that doesn't necessarily mean it's the best thing going, or even that it's going to be relevant to every organisation.

## RECENT HISTORY

Windows Server 2008 is the direct successor of Windows Server 2003, which was released on April 23, 2003. An updated version of WS2003 — WS2003 R2 — was released two years later on December 6, 2005, five months after the Beta 1 release of WS2008.

Windows Server 2003/2003 R2 are considered Microsoft's flagship server products and come in different versions, which support various levels of hardware configuration and system performance.

The most recent available market figures from IDG Australia from Q3 in 2007 show that Microsoft is very much in a dominant position in the server space, with a weighty 78.02% share, with Linux the next in line at 15.91%. But trends suggest that shipments of new servers configured with Linux are on the rise, while those running Windows have dipped slightly. Now, admittedly, these figures may be slightly out, as many companies buy server hardware without an operating system — and instead use licences available on corporate or other volume licensed accounts — or install a freely-available distribution of Linux. But the variation is slight — and certainly not enough to change the overall Australian picture.

The overwhelming advantage which Microsoft has in the market is its end-to-end product dominance. Interoperability between server, application and desktop gives Microsoft an extremely strong platform from which to launch more products into the market, and it is into this market which Windows 2008 makes its debut.

> THE OVERWHELMING ADVANTAGE WHICH MICROSOFT HAS IN THE MARKET IS ITS END-TO-END PRODUCT DOMINANCE

## INDUSTRY IMPACT OF WS2008

What does WS2008 mean for your server network? The best way to tackle this question is to realise that, just like WS2003, WS2008 has many potential roles in any organisation, and so much depends on the infrastructure and system configurations already in place.

Windows operating systems have a tendency to be examined in isolation, or at least in direct comparison to previous Windows builds. In an environment where Windows is the dominant server operating system, responsible for file, print and authoritative user management, this is a reasonable approach. But for organisations where this isn't the case, even if there are Windows servers present, it does not equip IT managers with the information to make fully-informed judgements. The reality of business computing is that most organisations support a number of systems of different builds and flavours, so any new product has to be assessed against the whole range of alternative solutions.

Despite the large range of features and solutions WS2008 brings to the market, a distinction must be made between the primary roles of file/print/AD and everything else. This is not to diminish the importance of all the technology arbitrarily lumped into 'everything else', but more to place the emphasis on the first three roles as primary determinants of WS2008's impact in any organisation.

Does your business already run Active Directory as its primary authoritative user management system? Are your files stored on Windows servers? If the answer is yes, then WS2008 already has less work to do in convincing you of its importance, and you can afford to spend more time examining the new features it will bring to your organisation.










# erver 2008

But, if the answer is no, then does WS2008 do anything to convince you to make a move towards the Microsoft way of doing things? Will it integrate smoothly with your existing infrastructure, and does it address a need which isn't already being met? Do you even need to bother with it?

## CORE FEATURES — WINDOWS ENVIRONMENTS

For organisations already running Windows Server as their primary provider of file and print services, WS2008 has plenty to offer and makes a compelling business case.

There are a number of enhancements to file services in WS2008. One of the most discussed is the inclusion of SMB 2.0 (Server Message Block) protocol. This is also part of the Service Pack 1 code for the Windows 6.0 kernel which WS2008 is based on — and is an enhancement of the version bundled with Windows Vista RTM. Windows Vista SP1 brings it into line with WS2008, and the performance enhancements are considerable, as SMB 2.0 supports larger disk and network I/Os, makes more intelligent use of memory in the file copy process and makes use of concurrent file transfers or 'pipelining'.

In fact, if a business is considering deploying Windows Vista, Windows Server 2008 is practically a must. To get the full benefit of one you really need the other — significant features like Network Access Protection, server file searches, locally-spooled print jobs, locally-cached offline files and centrally-stored event forwarding are only fully supported in a WS2008/Vista SP1 environment.

Additionally, SMB 2.0 now supports symbolic links. These are essentially objects within the file system which point to another location but which can be used by the OS or any application as an actual location, rather than a shortcut. Symbolic links have been available to UNIX and Linux users for a very long time.

WS2008 also provides enhancements to BitLocker Drive Encryption, allowing admins to encrypt all server volumes, not just the system volume, and NTFS now has self-healing capabilities which allow admins to perform CHKDSK functions without having to take the server down.

Active Directory has been given an overhaul and broken down into individual, specific server roles — Domain Services (ADDS), Federation Services (ADFS), Lightweight Directory Services (ADLDS), Rights Management Services (ADRMS) and Certificate Services (ADCS). Each role can be installed individually, thus allowing the creation of specialised domain controllers and reduced overhead.

There is also a brand-new type of domain controller available in WS2008 — a Read-Only Domain Controller (RODC). Designed to improve security in branch offices where the physical security of servers cannot be guaranteed, a RODC replicates AD information from a hub DC, but the locally-held copy is non-writable and does not replicate back to the hub. Sensitive data, such as administrative accounts, is excluded from the replication, so if a RODC in a remote site is physically compromised or stolen, admins' accounts are not compromised. Implementing a RODC requires the forest to be at Windows 2003 functional level, and the DC running PDC emulation has to be running Windows Server 2008.

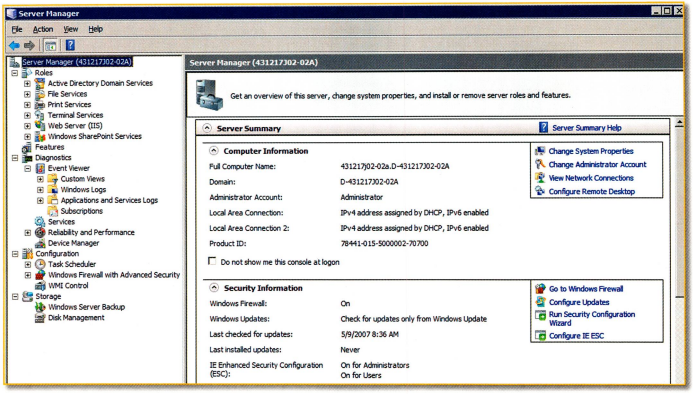
The classic GUI-based operating environment of Windows Server has been completely replaced with Server Core, a minimal installation option offering a command line interface with the server console. This offers significant security and deployment advantages over previous versions of Windows Server — Microsoft has estimated that the resultant smaller attack platform reduces patching requirements by approximately 60% over Windows Server 2000 and 40% over Windows Server 2003.

The idea behind Server Core is that most of the core server roles in Windows Server shouldn't require direct GUI access to the box in order to manage. As such, Server Core supports a variety of core server roles — DHCP, file/print, AD, WMS, DNS and IIS.

Additional optional roles are also available, such as WINS, Failover Clustering and Hyper-V virtualisation. The headless server is manageable via a range of tools such as Terminal Services, Windows Remote Shell, MMC snap-ins and various third-party tools. It can also be managed with PowerShell, a scripting language which allows administrators to automate tasks on the server or within AD. These management tools are also available for full graphical installations.

So, for existing Microsoft-based environments, the core features of Windows Server 2008 make a fairly compelling case for upgrade. The new server roles, Server Core and RODC all allow system administrators to re-think how Windows-based servers are deployed, what function they might fill and what efficiencies might be gained.

# Vista's rescue squad arrives




## CORE FEATURES — NON-WINDOWS ENVIRONMENTS

Whilst offering plenty to existing Windows environments, what do the improvements to the core file/print/AD functions in WS2008 mean for business which don't rely on Windows-based systems for their day-to-day operations? There are plenty of enterprises with firmly-established and fully-supported systems running NetWare, Linux, UNIX or Mac OS X Server. In these scenarios, what attractions does WS2008 have?

The short answer is, not much. The reality is that the vast majority of core services offered in WS2008 have generally been enjoyed for a long time in non-Windows environments.

Paul Kangro, Applied Technology Strategist with Novell, commented that "Windows Server 2008 is a good release from Microsoft, and it's good to see that they're starting to catch up to us, but we'd argue that we have some functionality and feature benefits which are still not there on the Windows platform — technologies like iFolder, iPrint, NetStorage, dynamic storage technology and a true hierarchical directory namespace."

The traditional model of Windows Server has essentially been a platform on which you can run Windows applications, along with some file and print functionality, and later some directory services added in.

Other server products instead have a long history of using a fully-integrated model as the starting point and then providing application support on top of that. Features like headless servers, terminal windows and read-only authentication directories have been around for a very long time.

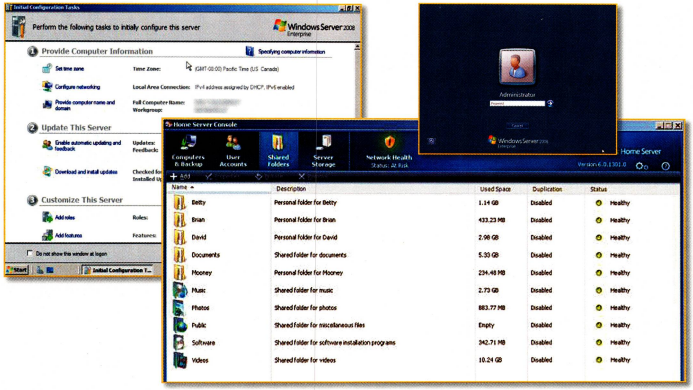
"UNIX and Linux admins have been using terminal windows for decades, and now suddenly it's a feature?" questions Kangro. As for the concept of RODC, he feels that while there certainly may be scenarios where you might want to deploy read-only directory replicas, most organisations with a rich security model wouldn't need it.

He states that "It's great that they now have a feature we've had in eDirectory for years, but it's like saying that now the server comes with a power cord. It's nothing to get excited about. But if security was a problem, I'd make the case that a Linux server would be really good in that environment, with something like AppArmor — which is available out-of-the-box — to lock it down and make sure it stays secure."

> THE OS SUPPORTS A WIDE RANGE OF NEW FEATURES, LIKE IIS 7.0, UPDATED TERMINAL SERVICES AND HYPER-V

Craig Fiegert, a Melbourne-based systems architect and industry consultant, agrees that the core features on offer in Windows 2008 won't tempt non-Windows customers away from their current setups: "Businesses running another server operating system for their day-to-day operations won't really care about Server 2008," he says. "Although Windows Server 2008 addresses a lot of needs for Windows customers, these needs have been met in non-Windows environments for years. In these environments, you usually see Windows servers deployed as a point solution — running SQL, SharePoint or Exchange — and in these scenarios there's often a reluctance to migrate to a new operating system, especially if it requires major changes to current infrastructural investment. The only real exception to this is where a business is forced down a particular technology path by third-party products. Once application vendors catch up and start writing software which only runs on Windows Server 2008, that's when we'll start seeing more penetration in non-Windows environments.

"But even with Windows customers, in terms of interest in implementing the RTM product, I wouldn't expect to see much initial interest from the small to medium enterprise market. Unless they're a greenfields environment looking to deploy a fresh system, SMEs will follow the usual twelve-to-eighteen months deployment cycle and we'll see new instances of Server 2008 coming online alongside hardware refreshes. However, big enterprises with an existing




Windows investment will probably pick up the product a lot sooner — for them, implementation is a low-risk, low-cost strategy, and they've generally got the in-house resources to make it work."

So it could be argued that in its provision of core services, WS2008 is seeking to close the gap between the traditional GUI-based Windows experience and the streamlined UNIX/Linux experience.

Rather than highlighting the differences between Windows and non-Windows systems, Martin Gregory, Director of Server, Tools and Platform Strategy for Microsoft Australia, certainly feels that functionality like PowerShell and Server Core will serve to make WS2008 more acceptable to non-Windows administrators: "At a conference of UNIX and Linux sysadmins, we did a demonstration of PowerShell. The whole room started applauding… until they realised that they were spontaneously applauding a Microsoft product!"

Gregory feels that WS2008's ease of management and centralised administration — without the need to resort to third-party products — will complement the traditional UNIX/Linux approach to system administration and will be an important marketing point for WS2008 to make an impact in non-Windows environments.

## SIGNIFICANCE OF NEW FEATURES

Moving on from the core services of Windows Server 2008, the operating system supports a wide range of new features, like IIS 7.0, updated Terminal Services and especially Hyper-V, Microsoft's new hypervisor-based virtualisation solution. Depending on the implementation and prevalence of existing Windows servers in a particular environment, any one of the new features included with WS2008 could easily be a compelling, knock-down reason to migrate.

IIS 7.0's new modularity alongside support with Server Core offers a completely new outlook on deploying specialist application servers, giving businesses the opportunity to quickly deploy feature-rich application servers with a minimal footprint.

Seamless, window-less presentation sessions in Terminal Services are another key feature. WS2008 makes deploying TS applications to clients incredibly easy and opens up a whole new range of options for businesses who want to centrally control applications, while

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# Vista's rescue squad arrives




improving application delivery to clients, both internally and externally via TS Gateway.

## VIRTUALISATION

But the big ticket item, and the one which has generated by far the most interest, is virtualisation. Hyper-V, Microsoft's hypervisor-based virtualisation solution shipped in beta format with Server 2008, with the final release due within 180 days after RTM. Virtualisation and server consolidation is easily the fastest-growing sector within the IT industry at the moment, as businesses scramble to cut costs and maximise return on hardware investment, while breathing new life into legacy systems. And VMware is the powerhouse of the virtualisation world.

"Microsoft are coming from an interesting position," explains Fiegert. "They are effectively a monopoly, but in the server virtualisation space they're very much a minority. However, what impact Hyper-V will have in the market has yet to be seen — Microsoft are commoditising virtualisation for customers who may or may not have considered it before. VMware is still the product of choice, but it's prohibitively expensive for a lot of people. Other customers are doing good work with virtualisation, like Novell and Sun with XEN, but they don't have the same market penetration that Microsoft does, and XEN penetration in the virtualisation market is next to nothing."

Certainly Gregory is of the opinion that Microsoft's suite of virtualisation products make a compelling business case: "You've got server virtualisation with Hyper-V, presentation virtualisation with Terminal Services and application virtualisation with SoftGrid, and they're all managed with the same set of tools, which is great for admins. Microsoft is encouraging its customers to get to grips with new technology, and we're working hard to make the experience a seamless one."

The discussion on virtualisation options is certainly an interesting one, but at some point rhetoric has to translate into hard business decisions, and with Windows Server 2008 now presenting the possibility of out-of-the-box virtualisation, how do companies balance the decision between a proven track record on one hand and cost-effectiveness on the other?

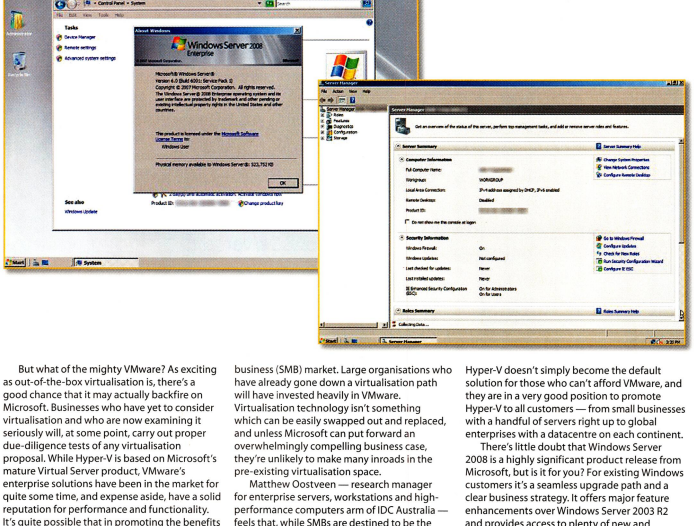
> THE BIG TICKET ITEM, AND THE ONE WHICH HAS GENERATED BY FAR THE MOST INTEREST, IS VIRTUALISATION

According to Kangro, it all depends on what you want to achieve through virtualisation. "When you virtualise your server operating systems it allows you to focus much more heavily on applications. The virtualised OS essentially becomes just a launching platform for applications, with the underlying hardware becoming simply the means to an end, rather than the end itself."

Certainly Novell is keen to promote the virtues of its own out-of-the-box virtualisation solution, XenSource, over Hyper-V. Featured in SUSE Linux Enterprise Server 10 (SLES10) XenSource supports failover of virtual machines without having to take down the virtualised host — similar to VMware's VMotion — whereas Hyper-V as yet does not support this. However, Novell is in no doubt as to the danger of competing head-to-head with Microsoft in the virtualisation space and is leveraging off the benefits which have come to both companies through their joint patent agreement, which was announced in November 2006. Both companies now fully support each other's VMs — you can run a Microsoft VM on XenSource and vice versa with no reconfiguration of the VM required. You can also call Microsoft for support on a SLES10 VM hosted on Hyper-V, or call Novell for support on a WS2008 VM virtualised on XenSource.

"There's a very strong industry demand for different platforms to interact well together," explains Kangro. "CIOs were very pleased with our agreement with Microsoft — they said 'Thanks goodness you guys have figured out how to play together'. What we're trying to do is to ensure that Windows and Linux work better together: we know that ultimately the industry is going to contain a mixture of these products, and virtualisation lets us make that happen."

# Vista's rescue squad arrives




But what of the mighty VMware? As exciting as out-of-the-box virtualisation is, there's a good chance that it may actually backfire on Microsoft. Businesses who have yet to consider virtualisation and who are now examining it seriously will, at some point, carry out proper due-diligence tests of any virtualisation proposal. While Hyper-V is based on Microsoft's mature Virtual Server product, VMware's enterprise solutions have been in the market for quite some time, and expense aside, have a solid reputation for performance and functionality. It's quite possible that in promoting the benefits of virtualisation, Microsoft may drive more customers towards VMware.

So has Microsoft started a fight that it can't possibly win? "Probably yes," admits Fiegert, "every corporate customer over 300 users that I deal with has virtualisation, whether it's VMware Server or VMware ESX — right down to the IT department using VMware Workstation or Player for testing and support. But if Microsoft can carve out a 5% or even 10% market share from nothing, then it's a worthwhile exercise for them."

Gregory is definitely confident that Hyper-V will prove successful. "The cost factor compared with our competitors is very much in Microsoft's favour," he explains, "we're very confident about Hyper-V's performance against our competitors, and for customers who implement Hyper-V, there are significant ongoing cost benefits as well."

So where will the fight for virtualisation take place? Almost certainly in the small-to-medium business (SMB) market. Large organisations who have already gone down a virtualisation path will have invested heavily in VMware. Virtualisation technology isn't something which can be easily swapped out and replaced, and unless Microsoft can put forward an overwhelmingly compelling business case, they're unlikely to make many inroads in the pre-existing virtualisation space.

Matthew Oostveen — research manager for enterprise servers, workstations and high-performance computers arm of IDC Australia — feels that, while SMBs are destined to be the battleground for virtualisation supremacy, the lack of resources which such companies often have to endure will make the job difficult. "It's all eyes on SMB," he asserts: "Having such a complex operating system is a double-edged sword, since its success is going to depend on penetration in the SMB market. The challenge is for Microsoft to skill up the larger systems' integrators to be able to support this."

Certainly, Microsoft is aware of the challenge and is pushing its education and certification offerings very strongly. Backed up by veritable armies of resellers, certified trainers and Gold/Platinum partners, Microsoft is certainly not short of resources or supporters to promote and evangelise the benefits of Windows Server 2008.

So how much impact will Hyper-V have in the market? The reality is that it is already having a major impact. Virtualisation is now available to businesses who previously weren't considering it or who couldn't justify the cost of a VMware solution. But Microsoft is keen to ensure that Hyper-V doesn't simply become the default solution for those who can't afford VMware, and they are in a very good position to promote Hyper-V to all customers — from small businesses with a handful of servers right up to global enterprises with a datacentre on each continent.

There's little doubt that Windows Server 2008 is a highly significant product release from Microsoft, but is it for you? For existing Windows customers it's a seamless upgrade path and a clear business strategy. It offers major feature enhancements over Windows Server 2003 R2 and provides access to plenty of new and exciting technologies.

For businesses who haven't taken the Microsoft path, or who have only implemented Windows Server to fulfil very specific, application-driven needs, it's very much a case of 'business as usual'. Windows Server 2008 doesn't present any compelling reasons which might entice decision-makers to take the major step of moving away from the current investments of day-to-day operational infrastructure. In its core file, print and directory services, WS2008 doesn't present any stronger challenge to its competitors than its predecessors did.

However, the extensive application suite which this product offers, coupled with Microsoft's existing industry dominance, makes Windows Server 2008 a force to be reckoned with. MS has presented a product which gives unprecedented scope for flexibility and server specialisation, which will have a major impact on the market — whether you run it or not. UTC

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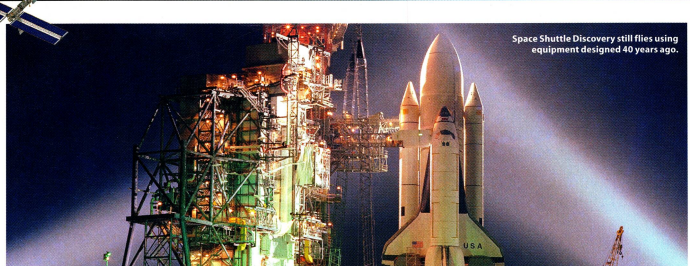
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Space Shuttle Discovery still flies using equipment designed 40 years ago.

# Computers in space

**Modern computing is only now making it into space, where technology has had to deal with unusual problems, writes *David Braue*.**

The movies may have given us a vision of space technology that includes phasers, warp-speed travel and the preternaturally intelligent HAL 9000: "Good morning, Dave. Would you like to play a game of chess?"—but the reality is that most space missions have been executed with less onboard computing power than you have in your iPod.

Even when the Space Shuttle Discovery blasts off for the 123rd Space Shuttle flight next month, it will be guided by computer systems whose basic architecture was designed nearly 40 years ago. This is, surprisingly enough, by design: despite the high-tech aura around space exploration, restrictive design constraints mandate a less-is-more philosophy that has long forced NASA and its subcontractors to eschew the IT world's latest and greatest.

NASA's Mercury manned space missions had no computers at all when they carried astronauts into orbit at the dawn of the 1960s; computers at Mission Control radioed instructions to the capsules from the ground. It was in 1963, for the subsequent two-man Gemini missions, that IBM kicked off the age of computers in space by delivering the first of 20 systems that it would eventually build under a US$26.6m contract.

The systems, which each weighed 26.75kg and were built using discrete electronics rather than integrated circuits, were designed to support tricky rendezvous manoeuvres during the Gemini missions, could execute around seven instructions per second (one per 140ms) and used a 'ferrite core' magnetic storage system that offered a whopping 4,096 bits of storage.

## BRAVING THE (LACK OF) ELEMENTS

In charting a course through a completely new area of software design, IBM, NASA, Lockheed Martin, CalTech's Jet Propulsion Laboratory (JPL) and other space program participants have learned the hard way just how the extremes of space travel can pressure software development.

Careful analysis, iterative testing and debugging of code, and the claustrophobia of early systems — which had just a few thousand bytes' worth of space to store complex navigation, communications, control and other applications — all forced developers to make their code as bulletproof, efficient and modular as they could. Yet even the best planning in the world can do nothing to change the many factors that make space an inherently inhospitable place for computer systems.

The most obvious difference between terrestrial and space-bound environments — the lack of gravity — is actually the least part of the problem, since it will only disable things like old, ball-style computer mice. Far more of an issue are things like air pressure: to reduce design strength requirements, capsules are intentionally kept at pressures of less than one atmosphere, for example, but hard drive technology relies on ambient air pressure to keep the magnetic plates and heads from crashing. Take away the air, or even just lower its pressure too much, and any hard drive will turn to scrap faster than you can say 'head crash'.

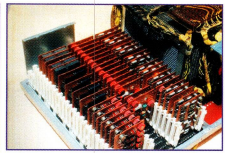
This issue kept NASA using a seemingly primitive technology like ferrite core storage, which uses magnets to store data in overlapping grids of fine wires, right through the design of the Space Shuttle. Higher-capacity tape, rather than hard drives, eventually supplanted ferrite core memory because tape heads physically contact the medium, so can reliably operate even in a vacuum — as long as there's power.

This last issue becomes particularly poignant hundreds of kilometres in the air, since the only electricity available to control systems is that which can either be brought into flight, generated from solar panels attached to the craft, or — in the case of long-distance probes like Voyager 1 — produced by specialised radioisotope thermoelectric generators (RTGs) that convert heat from radioactive decay into electricity, albeit a small amount of it.

Power considerations alone are enough to keep systems designers' ambitions low, which explains why they weren't pushing for the latest and greatest CPUs when designing systems. Indeed, even the International Space

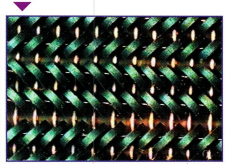


**The lack of gravity in space poses little problem for general computer operations (except for components like old, ball-style mice).**



**Ferrite core memory (magnets in overlapping loops of wire) used in the IBM AP-101 that are still in use on the space shuttle.**





**A docking computer used for the Apollo 16 moon mission which has less power than your iPod.**

Station's command and control computers are based on (by earthly standards) lowly 80386SX-20 class processors (and 80387 math co-processors). When you're fighting a host of other systems for a limited supply of power, the latest and greatest simply doesn't look that appealing anymore.

High power consumption produces another problem that must be addressed when putting computers in space: heat. The air in earth's atmosphere acts as a natural heat sink, pulling away much of the heat generated by CPUs, hard drives and other equipment. But in the vacuum of space, there is no such relief: any power is converted into heat that must be dissipated through specially designed radiators.

## TO THE STARS AND BEYOND

So, despite more than 45 years of progress in computer technology, it turns out the Mercury designers were right: the best computers in space are no computers at all. And, if you have to send a system into space, make sure it has a small physical and power footprint, is utterly reliable and redundant, and can be managed remotely.

HP achieved a public relations victory when its ProCurve networking products were selected by the the German EADS Astrium company to equip a module on the International Space Station (ISS) with a number of Ethernet switches. The ProCurve switches were subjected to extensive tests at the Proton Irradiation Facility in Villigen, Switzerland, where they were exposed to radiation in a particle accelerator under conditions similar to those found in space.

But manned missions present serious challenges in building systems reliable enough to be trusted with human life. While this imperative isn't present in unmanned exploration of the outer planets, designers of those missions — such as Galileo's trip to Jupiter in 2003, Magellan's 1996 trip to Venus, or Cassini's 2004 voyage to Saturn's moons — have faced other challenges, particularly in terms of comparing power consumption and computing capability.

Missions such as next year's Mars Telecommunication Orbiter will test the use of nuclear power in space, which would resolve many constraints on computing power. In the meantime, however, the boffins at JPL have managed to squeeze one very familiar technology — IBM's Power processor architecture — into the US$420m Phoenix Mars Lander, which left for Mars last year to look for the building blocks of life.

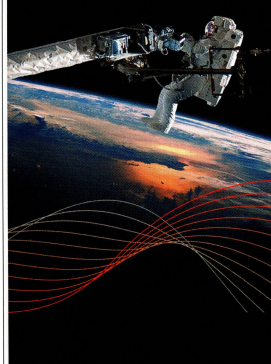
IBM's RAD6000 system, a version of IBM's RS/6000 architecture (the one that beat chess champion Gary Kasparov) that has been radiation-hardened by BAE Systems, won't be the only such CPU on the red planet's surface: the chips have already performed admirably, despite winds of more than 100km/h and temperatures at nearly -200 degrees, in controlling the Spirit and Opportunity Mars Exploration Rovers over the past four years. They also featured in the 1997 Pathfinder mission, managing the lander's landing, camera, communications and other systems.

Given NASA's necessarily conservative approach to systems design, odds are that the tried-and-tested RAD6000 will feature in many upcoming missions. But despite the restrictions that space travel imposes, however, engineers' success in building systems for space confirms the power of determination and innovation. HAL 9000's invitation to chess will be a long time coming — but, then again, the way things worked out for Dave Bowman, perhaps that can't be all bad. ETTP


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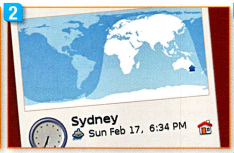
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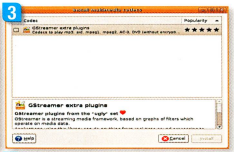
*For as long as you own the product, with restrictions on ordinary replacement cycle(s). In most countries. See Notice of Limited Warranty for details. Not all products have lifetime warranty coverage; warranty and coverage options vary by product. See ProCurve Routing Switch 9300m Series, ProCurve Switch 8200zl Series, ProCurve Access Switch Series 1 (Mar and Mar 7xx) on the ProCurve Switch 6200yl Series, and ProCurve Switch 5406zl Series for lifetime warranty duration. For details, refer to the ProCurve software license, Warranty and Support booklet or http://www.procurve.com

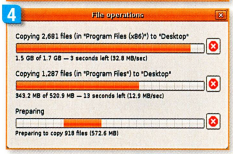
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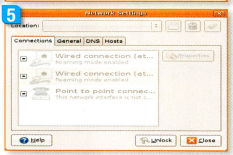



1. **The Hardy Heron development release desktop.**
2. **The humble clock now gets world clock and weather features.**
3. **Still prompting to install codecs to play DVDs (and still not working when they are).**
4. **The new GVFS back end performing multiple copy operations.**
5. **Network Settings with a new 'unlock' button for PolicyKit.**




# A look at **Hardy**

**This month, *Ashton Mills* takes a sneak peek at the next Ubuntu release: 8.04, aka. Hardy Heron.**

Since the original Open Source Challenge, which started on Ubuntu 6.06 and ended right about the time 7.10 came out, we saw many of the issues raised over the Challenge being improved or fixed as Ubuntu's development continued. And while Ubuntu passed as an alternative to Windows as the *only* operating system on your PC, there was still room for improvement.

So, with that in mind, this month we're taking a look at the next release — Ubuntu 8.04 — which is still in development. As such, we're not going to rate it on the Open Source Challenge scale (not until it goes final at least), but I can give you a glimpse of what's to come, where Ubuntu has improved, and what still needs more work.

## ALLITERATIVE TITLES

Like every release, the Ubuntu developers like to give milestones alliterative codenames — as far back as version 4.10, aka 'Warty Warthog', the names have more recently progressed (I won't list them all here!) to Edgy Eft (6.10), Feisty Fawn (7.04), and Gutsy Gibbon (7.10). Naturally, the next 8.04 release gets a title too, aka 'Hardy Heron'. Hardy is also going to be an LTS (Long Term Support) release, which means it will be supported on the desktop for three years and on the server for five. Considering Ubuntu usually releases every six months, this is a significant extension. There has been only one other LTS release to date, Ubuntu 6.06, which as a result is still being supported today. The plan, according to Canonical, is to release an LTS version every two years.

## NEW DOG, OLD TRICKS

So what's new in Hardy? There's no better way to explore than to install it and find out. On the Open Source Challenge machine I installed the latest daily build of Hardy Heron, which, from appearances, looks no different from 7.10 — save for a swanky, new background.

Installation was simple and painless — a good sign, even for a development release. Booting up, however, revealed that same old bugbear we've had ever since the Challenge began with Ubuntu 6.06 — the widescreen format of the monitor was still not detected and the default resolution of 1,920 x 1,200 was replaced by a low-resolution 800 x 600. Considering other Linux distributions have sorted this out long ago, it's a bit of a mystery why Ubuntu has so much trouble. Here's hoping this is on the 'to-do' list before release.

Next, the DVD playback test. Totem, as with previous versions of Ubuntu, recognised it didn't have the necessary codecs installed and prompted to install them (via the GStreamer package). Unfortunately, even after being installed, Totem spat out that it couldn't recognise the DVD and refused to play it. Other DVDs met with the same response. Installing Xine as the back end elicited a better result, with some of the DVDs initially playing — but then suddenly crashing. There is an advisory with Hardy at the moment stating that CD/DVD drives may not work as expected, so we'll put it down to that for now and check simple DVD playing in the final release.

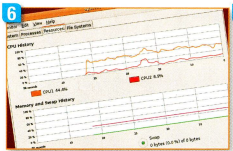
Network shares couldn't be tested at the moment due to a change that's occuring under the hood with Nautilus (which we'll cover below), and while the 'f-spot' photo importer worked fine, it wasn't automatically started when a camera was plugged in, as it is in Ubuntu 7.10. This is likely a function of the kernel, and along with CD/DVD support there's clearly a lot going on under hood in 8.04 that's still in the process of changing.

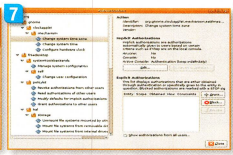
Common tasks such as using USB storage and web browsing were all seamless as expected, and in fact Hardy comes with the latest beta of Firefox 3.0, which should be final by the time Hardy itself is ready to go gold. Firefox 3.0 is a tad snappier and comes with a number of new features, which we won't go into here. Suffice to say it'll be a welcome upgrade when it arrives.

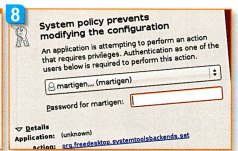
Aside from these main points, the current development build is quite useable, and this instalment of the Open Source Challenge was written with it!

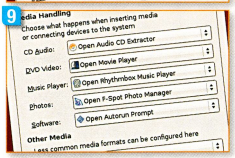
## WHAT ELSE IS NEW?

One of the major new updates is a kernel based on 2.6.24, which includes, among improved hardware support, the new CFS (Completely Fair Scheduler) in addition to better memory and I/O performance. Virtualisation is now integrated thanks to KVM

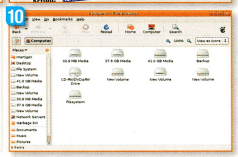



6 **The new System Management gizmo.**
7 **The new PolicyKit system administration tool.**
8 **What the user sees when accessing a restricted function.**
9 **Expanded Nautilus preferences — one of the many small touches in Hardy.**
10 **Nautilus looks much the same but sports some new features under the hood.**






## UBUNTU 8.04 IS SHAPING UP TO BE QUITE AN UPGRADE OVER 7.10 AND WORTHY OF THE VERSION-NUMBER JUMP

(kernel virtual machine) in the kernel, as well.

For the desktop there have been updated applications (the latest OpenOffice and GIMP, for example), new applications, and new technologies, some of which I'll cover here.

The most prominent of these is probably the new authorisation system, PolicyKit. A new administration dialog under System > Administration > Authorizations provides access to system-wide configuration of some of Ubuntu's features — everything from changing the clock time to accessing removable media can be invidually assigned to 'grant' or 'block' access. This gives much finer-grained control over user accounts above and beyond simply responding with the administration password when prompted.

Administration dialogs (such as network settings, configuring services etc.) can still be loaded up by a user, but options are greyed out and inaccessible. Instead, a new 'Unlock' button appears on the dialog, which, when clicked, prompts for a password to grant access to the dialog.

For those of you using Ubuntu as a single-user system, not a lot has changed — you still enter the administrator password to control these dialogs. For multi-user systems, or even for configuring access to a family PC around the home, this gives more flexibility in defining who can access what.

Xorg 7.3 is also new in Hardy, promising fixes and better monitor detection (well…), as it is a command-line based firewall configurator (ufw). Currently the firewall configurator is quite basic and has no GUI front end. Presumably this will be on the books in the future, otherwise it simply won't be used by the majority of users. Indeed, there's no indication this feature is even available from the desktop.

Speaking of which, Tracker gets an update with a handy tray utility that lists progress, in addition to an informative stats dialog. System Monitor display gets a whole new (and welcome) look — it's still not as smart as what you can find under Windows, but it's definitely an improvment.

One of the biggest changes under the hood is the phasing of GnomeVFS in favour of the almost identically named GVFS — a virtual filesystem layer that promises increased functionality and performance over GnomeVFS. Already you can see GVFS in action when copying files in Nautilus, presenting a single dialog for all concurrent copy operations and allowing these to be easily paused or cancelled. It also allows proper undeleting from the Trash by simply dragging files back out of it, something that wasn't possible before. In this build of Hardy, GVFS hasn't permeated to network transfers yet, and so these are currently disabled in Nautilus, but GVFS will also transparently manage these just like any other filesystem task on a machine.

Also under the hood is the new PulseAudio back end which, while still not fully working at the moment, promises new features like independent application volume controls and complex mixing and stream management, such as outputting a stream to multiple devices simultaneously.

Finally, a number of new applications also make a showing — Brasero is a popular Gnome-based CD/DVD burning suite and now comes as default. Transmission is an excellent cross-platform BitTorrent client. Vinagre is an easy-to-use remote desktop viewer for Linux and Windows clients, and the Avahi SSH and VNC server browsers get a look in as well.

Of course, what would a new version of Ubuntu be without an updated theme? Currently Hardy sports some spiffy, new desktop backgrounds, and what appears to be updated icons for features such as software updates and the tracker.

### LOOKING AHEAD

Ubuntu 8.04 is shaping up to be quite an upgrade over 7.10 and worthy of the version-number jump. The incorporation of a lot of new features, while addressing some of the common problems raised in the past, should see it adapt better than before as a primary desktop operating system, but, as this is the *Open Source Challenge*, you can be sure I'll put it through its paces for the final release — which is slated for the end of April. Will Hardy be a faultless drop-in replacement for Windows that doesn't fall over where Gutsy did? Let's hope.

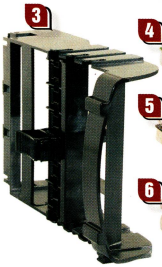
# Lenovo ThinkStation S10

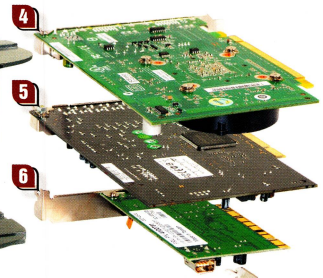






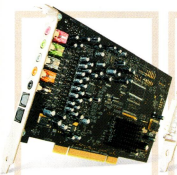



**This month, we're exploding a Lenovo ThinkStation. Known in Australia for its ThinkPad notebooks, but a maker of virtually every kind of hardware in China, Lenovo has launched a workstation range for computer-aided design, digital content creation and various industry applications. Workstations can handle the kind of graphically intensive applications that would bring a PC to its knees.**

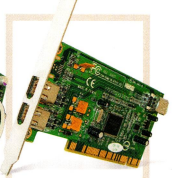
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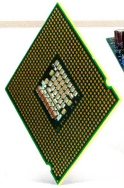



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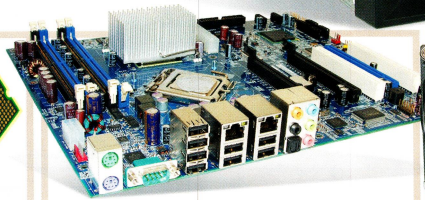


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# The third wave

**Along with Windows Server 2008 and SQL Server 2008, Microsoft has released Visual Studio 2008. *Nick Wienholt* goes inside the Team System version.**

The Team System product suite is a set of tools that sits on top of the core of Visual Studio and offers role-specific tools targeted specifically at Architects, Developers, Testers and Database Professionals. The role-specific tools are available separately, or in a bundled product known as Visual Studio Team System 2008 Team Suite.

The release of Visual Studio Team System (VSTS) 2008 and the accompanying .NET Framework 3.5 will be a welcome addition to any developer working on the Windows and .NET platforms.

If you're one of the developers who had a slow migration to Visual Studio (VS) 2005 because of the difficulty in getting a new version of the .NET Framework out to all your clients, VS2008 brings a welcome change to the way the Interactive Development Environment (IDE)/.NET Framework tie-in works, and has the ability to target different versions of the .NET runtime from within the same IDE.

Previous versions of Visual Studio were tied to a particular version of the .NET Framework, and developers typically had both Visual Studio 2003 and Visual Studio 2005 installed to work with software built on the different .NET platforms. Visual Studio 2008 addresses this issue by allowing a .NET project to be built on versions 2.0, 3.0 and 3.5 of the .NET Framework, as shown in the picture directly below.

VSTS was first released in 2005, and VSTS 2008 includes many new features. For developers, one of the most interesting and useful is the inclusion of code metrics. Experienced developers will often have a well-trained nose for detecting bad smells in software, but the application of code metrics formalises and automates the process. VSTS Developer Edition can detect code with the following potential problems:

- **High coupling**
- **Very deep class hierarchies**
- **Overly long methods**
- **High cyclomatic complexity (which is measured by looking at the number of possible execution paths in a piece of code)**
- **A poor maintainability index (which is an index based on extensive academic research on software systems, and includes a number of the other metrics)**

Architect Edition continues its role in providing tools that support Microsoft's Dynamic System Initiative (DSI). DSI aims to provide tools and processes that can guide and model a software project throughout the IT lifecycle, ensuring that business requirements are accurately transformed into software design and that the software produced is appropriate for the operational environment in which it will be deployed.

VSTS Database Professional brings the productivity of Visual Studio to the database world and supports the creation and management of database schema and schema unit tests that can be managed with source control. Database Professional also supports the generation of test data and allows various versions of a database schema to be compared, supporting simple and robust synchronisation of development, test and production environments.

VSTS and Visual Studio provide excellent support for smart device development, and VSTS Test Edition extends this support by providing the ability to run tests for the .NET Compact Framework. In addition to emulator execution, the tests can run on actual devices such as smartphones and PDAs, and this will be a great tool for embedded developers facing the challenge of ensuring the behaviour of their software is appropriate across a wide variety of form factors.

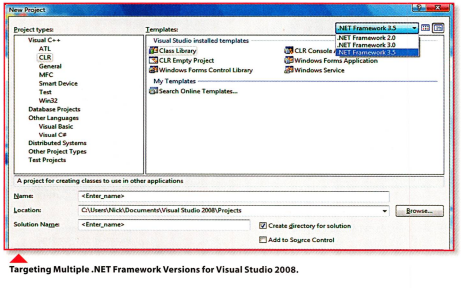
A welcome change in VSTS 2008 is the removal of a feature — or at least its demotion. In the previous version, developers wishing to use the built-in testing framework needed to have access to one of the VSTS products. Unit testing is now included with Visual Studio Professional and above.

## PROVIDING A LINQ

Of the hundreds of new features and improvements that go into a release of Visual Studio, it is rare that a single feature towers above all others in its potential and interest generated. In Visual Studio 2008, the introduction of Language INtegrated Query (LINQ) is such a feature. LINQ has the potential to markedly improve the way an application developer deals with the wide variety of data sources that their applications consume.

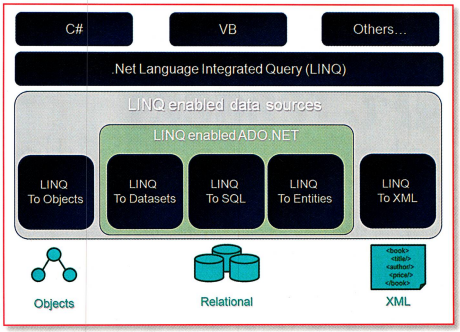
At its simplest form, LINQ is an extensible technology for traversing, sorting, querying and generally dealing with collections and collection-like data structures in a strongly-typed manner. In terms of existing technologies, LINQ combines many of the best features of the Standard Template Library (STL) in C++, Structured Query Languages (SQL) from relational database products and Object Relational Mapping Technologies (ORM) like the Hibernate framework.

LINQ is a series of extensions to both the .NET runtime and to a language that chooses to integrate LINQ, such as C# and Visual Basic.NET. The LINQ framework is extensible in a similar way to ODBC, allowing LINQ to be mapped to any arbitrary data source through a LINQ provider. A LINQ provider is responsible for translating a LINQ statement into a form that is appropriate for the data source that it is




**Targeting Multiple .NET Framework Versions for Visual Studio 2008.**




**The LINQ family of products.**

wrapping. A number of LINQ providers ship with the .NET Framework, as shown above-right. As an example of what can be achieved with a LINQ provider, a community project that provides a LINQ to Google provider can be seen on the CodePlex.com web site.

Like most development technologies, it is easier to appreciate LINQ through a code sample. Consider the following C# array of Australian capital city names:

```
string[] _names = { "sydney", "melbourne",
"brisbane", "adelaide",
                    "perth", "hobart", "darwin",
"canberra" };
```

Writing a method to go through the collection and find all the capital city names that are greater than seven characters and ordering them alphabetically isn't overly complex, but as the complexity of the filtering, sorting and extracting becomes more involved, the intent of the code can become lost in angle-brackets, semicolons and if statements. The C# long-hand way of writing this query using LINQ is:

```
var query = _names
  .Where(s => s.Length > 7)
  .OrderBy(s => s)
  .Select(s => s.ToUpper());
```

The first thing to note about this code is the return type: while it looks like C# has lost strong typing, the return type of the LINQ query will actually be an anonymous type generated by the C# compiler that includes all the properties of the data object returned by the query, and C# retains full strong-typing through this type inference and compile-time generation. The long-hand syntax is slightly awkward, and C# introduces a number of context-sensitive keywords to make writing LINQ queries more natural:

```
query = from s in _names
    where s.Length > 7
    orderby s
    select s;
```

These two code samples operate against in-memory data collections, but the implementation of a LINQ provider is not limited to accessing in-memory objects. The LINQ to SQL provider will convert the LINQ query to the appropriate TSQL statements and execute the query against the database when the results of the LINQ statement are required. This lazy execution serves a number of benefits, and allows multiple queries to be combined before the database is accessed.

## VISUAL C++ 2008

Visual C++ is often overlooked in the huge mix of products that form part of VSTS, but C++ is far from dead as a language and product, and Microsoft continues to be the biggest investor in C++ worldwide. For the first time in many releases of Visual C++, Microsoft Foundation Classes (MFC) fully supports all the user-interface features of the latest version of the Windows operating system (Windows Vista).

In addition to native development, Visual C++ 2008 has a number of new features that allow the bridge between the native world of pure C++ and the managed world of the .NET Framework to be bridged with ease. The new Visual C++ Marshalling Library provides an extensible template-based approach to converting data between managed and native types. The great variety of string types in C and C++ provides a headache when interacting between different libraries and technologies,



## THE BEST WAY TO EXPLORE VSTS 2008 IS TO DOWNLOAD THE TRIAL VERSION AND BEGIN BUILDING SAMPLE APPLICATIONS

and the Marshalling Library provides a clean and simple cure for this headache, as shown here:

```
#include <msclr\marshal.h>
TCHAR* c_style_string = _T("My C style string");
System::String^ dotNetString =
 msclr::interop::marshal_as<System::String^>(c_
style_string);
```

The best way of exploring VSTS 2008 is to download the trial version and begin building sample applications that make use of all the new technologies. The Visual Studio 2008 Training Kit is available as a free download from **http://go.microsoft.com/?linkid=7602397**, and this provides over five days of technical content, including twenty Hands-On Labs.

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**92** Boot error
**95** How do I overclock my PC?

**WINDOWS**
**92** What's making that noise?
**93** Hidden uninstall folders
**93** XP's reserved bandwidth
**95** Simplified performance wizard

**INTERNET**
**94** Unable to print in IE
**94** Easy image maps

**LINUX**
**95** Ubuntu distro for beginners

**PAST ISSUES**
**96** Portable passwords
**96** Virtual network
**96** Deleting files
**96** World map clock

**ASK THE QUESTIONS**
**97** More questions to answer

**ANSWER THE QUESTIONS**
**97** How to answer questions


## HARDWARE

### BOOT ERROR

**Q** Whenever I boot my computer (ASUS P5K-E with an Intel Q6600), I get the following error during POST: 'INTEL CPU UCODE LOADING ERROR', which forces me to press F1 on every boot. What is this error and how do I get rid of it?

***Philip Podgorski***

**A1** Having done some research into this error, it appears that there is a problem with the ASUS P5K-E motherboards. The 'U' stands for 'microcode'. So the motherboard's BIOS thinks that there is a problem with the microcode, the language protocol used between the CPU and the MOBO. The motherboard's BIOS needs to be updated to the latest version and this will solve the problem.

***John Douven***

**A2** The BIOS needs to load a patch table that supports your processor. On the ASUS web site there are tables of compatible CPUs for their motherboards. Navigate to Support > CPU support. Search by Motherboard > Socket 775 > P5K-E to find the BIOS revision that your CPU should be compatible with. Scroll down to the Q6600 and find the BIOS revision number (0201 or 0503 depending on the revision of your CPU), and update the BIOS to this or a later revision. It's usually OK to go to the latest stable revision (not beta), although sometimes this can lead to more problems. In this case, because both BIOS revisions that support the different CPU revisions are beta BIOS I would just go for the latest BIOS revision 1004 (1006 is a beta BIOS). Instructions for updating BIOS are available in the ASUS Manual with your motherboard or in the download section of the ASUS web site. Note: flashing your BIOS comes with certain risk.



**BY ALEX LOUDEN**
Alex is studying engineering at university and in his spare time he designs games, programs models in 3D and does graphic and web design. The image here is a fractal he created.

## WINDOWS

### WHAT'S MAKING THAT NOISE?

**Q** For the last six months my computer has been plagued by sudden frantic hard disk activity, with the hard disk emitting a screeching sound which persists for several minutes. On checking Task Manager I have traced the processes to searchfilterhost.exe, searchprotcolhost.exe, searchindexer.exe and svchost.exe. These are all Windows Systems files. Can you tell me what they're doing and what initiates them? Can they harm my hard disk and can I stop the activity?

***Brian Fuller***

**A** Searchindexer, searchprotocolhost and searchfilterhost are all processes used by the Windows Vista Search service. Together, these allow Vista to produce accurate indexes of data stored on your PC or on connected network shares and, as such, they're running constantly in the background. These processes combine to create a large overhead on the running PC, which is why they appear most obviously in the Vista Task Manager. However, disabling or even removing these processes and files will stop

## WHAT'S WITH THE READER BOX?

***APC* will give readers whose answer is highlighted a small promotion box in which they can promote themselves, their business or hobby – a URL or phone number can be included.**

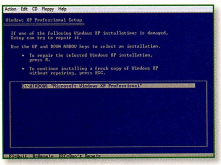


**YOUR NAME HERE**
A brief detail about how awesome you are that you could help.
**www.yourwebsite.com**

# askapc@acpmagazines.com.au

TIP... WINDOWS

## WHEN AN XP INSTALLATION REFUSES TO BOOT, IT CAN BE FIXED BY A REPAIR INSTALL









**1 XP CD**

**If Windows won't load and is displaying messages along the lines of 'Error loading operating system', it's most likely that the boot data has become corrupted. You can recover XP without having to wipe your documents or installed programs. Boot off the Windows XP CD. Select the option in the menu to 'Set up Windows now', press F8 to accept the licensing agreement. You should see your OS listed in the drop-down box.**

**2 REPAIR WINDOWS**

**Press R to begin a repair install. This install process, which comes complete with outdated feature billboards, will look identical to a standard Windows install. But rather than putting a completely fresh installation onto the drive, with a clean registry, it simply replaces your Windows system directory with the original files. This will fix most boot problems, and you'll still be able to run the majority of your programs.**

**3 CARRY ON AS NORMAL**

**Your Start menu should look the same as it did before Windows refused to boot. You may run into a few application compatibility problems with these older files. Make sure you install all the usual XP updates, such as Service Pack 2. If you get to this stage and a critical application will not load, then you can at least back up files and folders easily. These can then be transferred over to a completely fresh install of Windows.**

Vista functioning. Their presence, and the overhead they're placing on your system resources, isn't an indication of a problem.

On the other hand, the noise created by the PC is obviously not normal — this is a problem. Are you certain that the noise is produced by the hard disk? Fans inside the PC case, such as those installed in the power supply, graphics cards and processor can become noisy over time and commonly produce the kind of noise you're experiencing.

Open the case and start the computer while visually inspecting all the moving parts (fans and hard disks). Replacement processor fans are available from many computer spares sites, either online or on the high street. However, running the PC with a failing fan for even a short time will damage the processor. Source and install a replacement as soon as possible.

WINDOWS

## HIDDEN UNINSTALL FOLDERS

**Q** If I choose to show hidden files and folders in Windows XP, I see a large number of hidden files each called $NtuninstallKB followed by a number. These files are currently occupying a gigabyte of my hard disk space. Can I safely delete them?

***Rupert Fountain***

**A** These files are uninstallers for Windows Updates and are required by Windows if you choose to uninstall the updates via the Control Panel. You can remove them only if you're certain you'll never wish to roll back your PC using System Restore to a point before Windows installed the updates. Otherwise, it's best to leave them in place and accept the slight hit on your disk space.

Windows Updates are generally benign, but occasionally they can cause serious problems for your computer. Microsoft releases these updates to patch security holes and occasionally provide additional features for the target operating system. However, these are released on an 'as is' basis and aren't guaranteed to have no additional impact on the host system.

If you look at this from Microsoft's point of view it makes sense; they find a problem and repair the hole. From a user's point of view, it's slightly different. A driver or other hardware-dependent piece of software may rely on just that hole in order to function, particularly if the hardware hasn't been thoroughly tested before release.

The bottom line is to review Windows Updates before installation, and never to configure the PC to simply download and install updates automatically. The alternative is to allow Microsoft to make system changes to your computer without your notice.

WINDOWS

## XP's RESERVED BANDWIDTH

**Q** I recently read that Windows XP reserves some of your PC's bandwidth for its own use. Is this true, and if so can I get that bandwidth back for my own use?

***Alene Grimes***

**A** We had to do some research on this one but it appears to be true. By default, Windows XP allocates a 20 per cent hold on your bandwidth, the idea being to ensure you have uninterrupted surfing while Windows uses its own bandwidth for background requirements. But 20 per cent seems rather high; in fact, this can be reduced to nothing without any problems while gaining improved results at speed test sites.

To do this, click Start > Run. Enter 'gpedit.msc' to open the group policy editor. Go to Local Computer Policy > Computer Configuration > Administrative Templates > Network > QOS Packet Scheduler > Limit Reservable Bandwidth.

Double-click on Limit Reservable Bandwidth. It will say it's not configured, but if you click on the 'Explain' tab you'll see the notice 'By default, the Packet Scheduler limits the system to 20 per cent of the bandwidth of a connection, but you can use this setting to override the default'. Enable reserved bandwidth, and then set it to

0, which will force the system to reserve no bandwidth at all. You won't see a full 20 per cent returned to you, as packet scheduling will still be going on. But at least only the actual amount of bandwidth required for the scheduling will now be used.

## INTERNET

### UNABLE TO PRINT IN EXPLORER

**Q** Recently, whenever I try to print any page from within Internet Explorer I get the following error: "Cannot find 'file://C:/Users/Graham/AppData/Local/Temp/Low/MUPWE1OQ.htm'. Make sure the path or Internet address is correct."

***Graham Moyle***

**A1** I had the same problem and after searching the Microsoft Vista knowledge base I found the solution. If you have moved your Favorites folder to a different drive or partition you will find that moving it back to its original drive or partition will solve your problem.



**BY BRIAN MCDONALD**
Brian is 61, married with two children and five grandchildren with one more on the way. He took up an interest in computers six years ago and has completed a TAFE college course in IT.

**A2** The problem may be caused by a corrupted IE7 Temporary Files cache. Try clearing your cookies and files (via the Internet Options applet in the Tools menu of IE7, or Vista's Control Panel). If the problem persists, a malware scanner (like A-squared or some other good malware scanner and remover that's 64-bit compatible) should be available to download. Run a malware scan, and remove anything detected. As for the script error, some spyware likes to pop up random HTML pages (usually hidden inside the spyware itself) and cause a script error.



**BY MATTHEW COBURN**
Matthew is a student, who scripts programs and games in his spare time.

## INTERNET

### EASY IMAGE MAPS

**Q** I'm putting together a web site that uses an image map to act as links to other pages. I've looked at how these maps are written in HTML and it looks as though it's quite a job. I've thought about moving the mouse around above the image and noting the co-ordinates, but that seems a bit long-winded. There's got to be a better way. Is there?

***Laurence Charter***

**A** You don't say which platform you're using, but luckily there's a program that's free, will run on most platforms and makes a good, easy job of your task. If you don't already have it installed, download the GIMP (**http://gimp-win.sourceforge.net** for Windows) and load the image you want to map into that (just drag the file and drop it onto the main toolbox window).

When you have your image the size you want it, save it and then right-click on the image and select Filters > Map > ImageMap. A dialog box will open with your image on the left and a list box on the right. Select a shape on the left (ellipse, rectangle or polygon) and then click on the image where you want the points to be — you'll see how the border appears as you draw it. If you're using a polygon, double-click to finish.

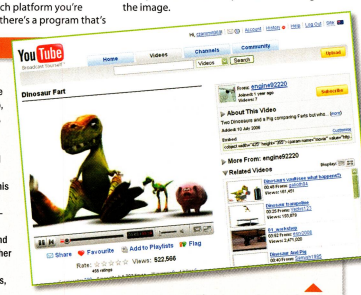
When you've finished, another dialog box will appear, allowing you to type in a link or edit the co-ordinates. As each area is completed, it appears in the area on the right — you can edit these again by selecting an area and clicking on the Info button. You can also change the order of the areas (if you have one above another and want to change the priorities of them) by selecting one and clicking on the up and down arrows.

When you've finished, click on 'Save'. The file with the image map HTML code in it will be saved so that you can just copy it into your page or use it as a web part in an SSI. This is useful if you want to use it in many pages, and it makes it easy to edit them all if you want to change the image.

## TIP... PC POINTERS

### TIPS FROM AN EXPERIENCED USER

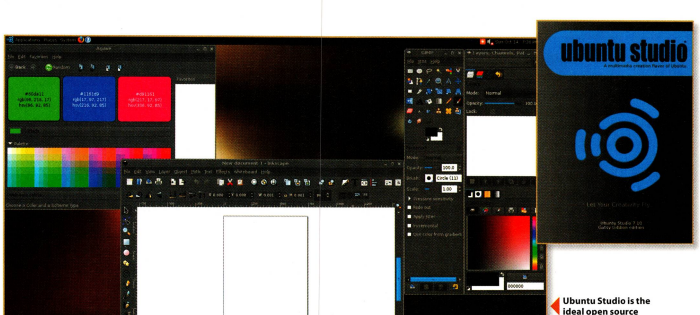
1. Once a system has XP installed (its programs, updates etc.) and runs OK for a week or so, delete your restore points and create a new one.
2. Use a program to do a disk image of your C drive. Then you always have something to fall back on if things go wrong.
3. Enable the 'status bar' in Internet Explorer. Then if you highlight a link it tells you where it will take you and, if it's a file, what kind it is, i.e. .exe, .jpg, etc.
4. Why do people use programs to download YouTube videos? If you can watch the videos, then you have already downloaded them. You have to go and get them in your temporary internet files. If they are flash files, change the extension to flv and convert them to what you want.
5. When people load programs that require temp files to be stored: configure that program in options or settings to store those files on your second partition. Just make a folder called 'temp folder' with sub-folders for each program and then delete them when the project is completed, as Windows stores temp files to just about anywhere and novices never know where to look to remove them.
6. I have had only had two viruses in over three years of surfing the net. I run the following software: XP Pro, Zone Alarm as my firewall, AVG Antivirus free, and Spybot S&D — with the timer running and blocked pages pop up asking whether to block or not (this should always be your choice), and BHOdemon — stops any browser helper objects that try to load. And to remove spyware and other junk, I use these removal tools that work: Hijack This, CWS Shredder, AdAware, Windows & Internet Cleaner Pro.
7. Basics that should be imprinted on foreheads of users:
   - If you're not sure, don't click it.
   - If you don't know the email, delete it.
   - Don't let anyone use your PC — ask them to get their own.
   - Don't panic — remember, you have a disc image — repairers will hate you but you'll be up and running again in 40 minutes.




**There's an easier way of getting hold of those YouTube videos...**



**BY GLEN JEPPESEN**
Glen is 48 years of age and has mainly worked in the auto manufacturing industry as a machinist. He now works for the city of greater Geelong and currently is a team leader of a city service unit.




Ubuntu Studio is the ideal open source choice for all Linux-based designers.

## WINDOWS

### SIMPLIFIED PERFORMANCE WIZARD

**Q** I have a Windows XP PC which is behaving badly. At certain times of the day the PC will apparently slow down and my users have to restart it, causing problems with their efficiency. How can I tell what's causing the PC to behave in this way?

***Stephanie Christensen***

**A** Troubleshooting often starts with the event log. The event log is a list of events written to the log by defaulting applications and the operating system. It can often contain important clues as to why the PC is suffering a performance hit. Examine the system event log and look for System Events 6005 (event log service stopped) and 6009 (Windows startup). These are landmarks in the log as they point to start-up and shutdown events and so can be used as a starting point for your search.

The error log contains information about system events but it doesn't contain information about system performance. This information can be measured in the performance monitor and used to diagnose performance issues.

The Performance Monitor wizard is a free download from Microsoft intended to simplify the complex task of collecting and analysing data obtained from other PCs on the LAN. Relevant counters required for common tasks are preset and the data is outputted in HTML, enabling it to be viewed from any browser. Download the Performance Monitor wizard from **http://support. microsoft.com/kb/248345**.

Following the download, extract and run the Performance Monitor wizard, entering the name of the computer that will be collecting the logs and the name of the remote computer from which the logs are to be obtained. A choice of three groups of counters is available: 'Standard Performance', 'High CPU Usage' and 'Advanced'. For simple monitoring and troubleshooting, use the 'Standard' set of counters. For diagnosing performance issues relating to possible CPU load, use the 'High CPU' set of counters.

## HARDWARE

### HOW DO I OVERCLOCK MY COMPUTER?

**Q** Since my PC's FSB (frontside bus — the speed at which your processor, motherboard and memory communicate) is quad-pumped, wouldn't overclocking the bus speed result in the FSB going up to the point where it isn't supported by the motherboard? My current motherboard — a Gigabyte 965p-s3 — supports up to 1,066MHz. If I were to overclock my bus speed from 266.7MHz to what I want (either 333MHz or 400MHz), the FSB would then be 1,333MHz or 1,600 MHz? Will this damage my motherboard, or is this what is supposed to happen in an overclock?

**A** This is pretty much what happens with an overclock. Increasing the bus speed in the BIOS (or OS-based overclocking application) can increase well past the officially supported maximum FSB on motherboards. Though the Gigabyte 965P-S3 is rated for 1,333, so it at least allows you to run the bus speed at 333 without going over its designed parameters. There is always a chance you can damage any of the components in your PC when overclocking, and vendors generally won't replace parts under warranty if that's the case, so do so at your own risk.

***Nick Race, APC Technical Editor***

## LINUX

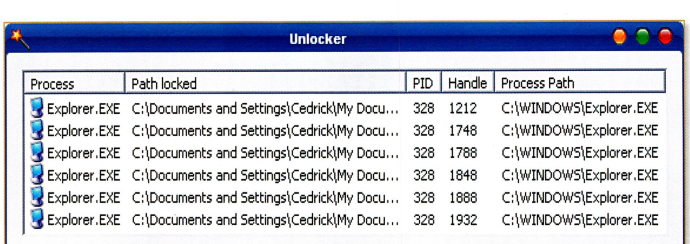
### UBUNTU DISTRIBUTION FOR DESIGNERS

**Q** I'm a design student on a (very) tight budget and have heard that Linux is now becoming more mainstream for multimedia editing. As I can't afford the professional tools for Windows, I think I need to go with Linux and the open source editing tools available for it. Can you advise where I should start?

***Peter Joslyn***

**A** Luckily for you there's a flavour of Linux geared directly at multimedia professionals. It's called Ubuntu Studio. What you get is a suite of audio, graphics and video-editing programs such as Ardour 2, a multi-track recorder/editor geared toward people familiar with Pro Tools, The GIMP, Inkscape and Blender for graphics, and PiTiVi, Kino and Cinepaint to edit video.

Just go to **http://ubuntustudio.org** and click on the big 'Download' button. While you're there you can click on the 'Support' button if you need further assistance. If you've only ever used Windows before, there will be an initial learning curve, so we'd recommend reading all you can before going ahead with your first install. And, if you can, practise on a spare PC first before going ahead and installing it on your main work computer.




**Unlocker well help you to get undeletable files to do what you want them to do. Simply find the program (or object) that you want to delete on the list and Unlocker will make deleting possible.**

## PAST ISSUES

**Q** I occasionally have to use PCs other than my own to log in to my webmail and other accounts. I'm concerned about the possibility of key-logging software capturing my details. How can I prevent this from happening? **(Feb '08)**

**A** The strategy I use takes advantage of the fact that keyloggers don't record mouse movements. I type some characters of my password with some incorrect characters in amongst them. I then use the mouse to highlight the incorrect characters which I replace with correct ones. I may even leave out characters and then use the mouse to insert them in the correct place. While the correct characters have to be typed at some stage, they don't have to be typed in the right order, and a lot of other garbage can be typed in amongst them as well.



**BY BRUCE WILLIAMS**
Bruce is from Townsville, Queensland. He's 47, married with four children and works as a key account manager for a nationwide wholesaler that supplies electrical equipment to industry and mining.

**Q** Is there a simple and inexpensive way to link two (or more) home networks via the Internet to create one virtual network? **(Feb '08)**

**A** There is indeed a simple and inexpensive way to link, which I personally use for user support. It is a little program called Hamachi (**https://secure.logmein.com/products/hamachi/advantages.asp**). The way it works is by setting up a virtual network adapter on your system. You then create a username and you're away. All you have to do is create a network with a password (note that longer and more complicated passwords are always the way to go). Others can then install the program and join that network as long as they have the correct name and password. Whoever creates the network name in the first place will be able to evict others if they find they are abusing the system.

There is a free (slower and limited to 16 linked systems per network) version available which is a great way to test. Then there is a premium version which costs US$4.95 a month or US$39.95 for a year. This one works faster and has added benefits (incl. better security). The great thing about this program is that it fools your systems into thinking they are simply connected on a local peer-to-peer network, so everything works as it would on a real peer-to-peer network, including file and printer sharing. Just a word of warning there. Keep in mind this fact when you choose what to share!

**BY SEBASTIAAN SCHOLTENS**
Sebastiaan has 15 years of IT support experience and has been running his own business for the last five years. He's currently starting again after a move from the NT to NSW.
**sebastiaan@blaisont.com.au**

**Q** I have some trouble deleting files. I have quite a few files in 'Deleting Items' which will not delete. What do I have to do to delete these files? **(Feb '08)**

**A¹** Reboot the computer and press F5 immediately after the BIOS screen shows. You may have to do this a few times. Then start in safe mode with the command prompt only. You should be in your boot disk's My Documents folder. CD (change Directory) to the relevant folder and, when there, use the DEL command to delete the file, but remember to enter /p after the filename to make sure you are prompted for the deletion. You should be able to delete the files from there.



**BY IAN A. WHITE**
Ian runs WAI Engineering, specialising in AutoCAD services and training. He also carries out installation and configuration of hardware and software. **www.wai.com.au**

**A²** If restarting the PC to let the file be released or deleting from safe mode doesn't work, there is a nifty small program called Unlocker available from **http://ccollomb.free.fr/unlocker** that will force these undeletable files to obey. But please use caution — don't delete critical system files.

**BY JASON ROBERTS**
Jason is a 26-year-old avid *APC* reader who is looking for job as a hardware technician. He started using computers as a child, when he was about 10 years old.

**Q** I've seen a world map as a desktop background, with day and night marked on it. Is it a plug-in and where can I find it? **(Jan '08)**

**A** There is a freeware product from Map Maker called 'Sun Clock', which runs on XP. On world map it shows the moon shadow (various intensity levels) as well as various times across the world. It's pretty cool, and available at **www.mapmaker.com/**.

***Ray Abela***




# Ask the questions

**Send your technical questions for other expert readers to answer to askapc@acpmagazines.com.au.**

I read in your latest edition of *APC* that you can't hide from the police as they have the equipment to recover your data. So what good is that software that claims you can delete your info for good? Could someone clear that up for me?

***Stacey***

I have two questions with regard to Internet Explorer 7: a) How can I make the Favorites menu extend full length on first selection, rather than having to re-click on the down chevron? And b) When adding a site to the Favorites menu and I select 'Create in Favorites', how can I extend the Favorites menu in a collapsed rather than expanded form?

***Peter Kentley***

I'm trying to source an application for a customer who wants to use a barcode scanner to catalogue a fairly extensive collection of DVDs. The problem is that all the apps I've found so far totally ignore Region 4 discs, so each disc has to be manually entered. Have you run across an application that will do this? All discs are legal — no 'backup copies' etc.

***Mark Johnston***

My computer sometimes boots up and sometimes does not, as the primary hard disk has disappeared from the BIOS. It also shows the message 'Secondary IDE channel no 80 conductor cable installed'. It started after I installed an ASUS LightScribe DVD burner. As well, my hard drive partitions always open in a new window. And, the 'Show Hidden files' feature does not work. How can this be solved?

***Joseph Z. Boso***

My computer is pretty good, but for some reason over the last few months it is taking a few goes to turn it on. I go to switch it on but it just turns off. Sometimes it will start straight away, sometimes it takes three goes. The computer works but it is just annoying if anything. Do you know why it would be doing this? The computer is an HP Pavilion 8518.

***Cora***

When I start up my computer, which is a Toshiba Satellite 1410, with Windows XP Professional 2002 SP3, the following message pops up: 'SQL Dumper library failed initialisation. Your installation is either corrupt or has been tampered with. Please uninstall and then re- run the setup to correct this problem.'

I am unsure of how to do this. Could you please help?

***Joshua***

Because I foozled the updating of Windows XP Pro, every time I boot I have three Windows XP Pros on the black screen just before booting. The first one is the right one and the PC will automatically boot from this one. The second (if I choose to boot from) will ask for a CD to continue the update, the third one boots to a new Windows XP with the original Windows screen, but with no programs or data (the kind you get after reformatting the hard disk). And on Windows Explorer I have two windows, Windows and Window 2. What's going on — and, short of reformatting the C partition, what can I do ?

***Gabriel Garrigues***

On a standalone PC, not connected to the web, running XP Pro with SP1, I tried to install SP2 from a CD obtained from Microsoft, because a program asked for it. It installs alright, but it will not boot after the installation. I have never had problems installing OSs or programs before, but this one has me stumped. Any ideas?

***Peter***

I have a program called Panasonic Lumix Simple Viewer. Every time I boot my computer it launches at start-up. I've looked through options and settings but it seems there is no way to disable it from launching at start-up! Can you help?

***Edmond***

# Answer the questions

**If you feel you can answer one of the questions above, please send the answer to askapc@acpmagazines.com.au.**

*APC* will give any readers whose answer is published a small promotion box in which they can promote their business with a mission statement or slogan, and a URL or phone number. Try to make the answer no longer than 200 words, but less is better. If none of our readers can offer an answer to a particular question, we will turn to our list of industry experts to provide a solution for your queries.

# Building a small business network

## WHAT'S COVERED

**Overview**
In this new Masterclass, Jarrod Spiga walks you through the process of setting up a small business IT infrastructure. No IT training is assumed. At the end of the Masterclass, you should know the fundamentals of setting up a server-based network to run any small business.

## ABOUT YOUR TUTOR

**Jarrod Spiga**
Jarrod is an infrastructure architect and data centre engineer for Visionbytes, a company that provides digital video mining technologies and services to some of the world's largest media companies and many government departments worldwide. Jarrod also works as a technical consultant, assisting businesses during infrastructure installation and upgrade projects.



## COURSE SCHEDULE

**Sept '07** Analysis
**Oct '07** Preparation
**Nov '07** The Windows path, part 1
**Dec '07** The Windows path, part 2
**Jan '08** The Windows path, part 3
**Feb '08** The Linux path, part 1
**Mar '08** The Linux path, part 2
**Apr '08** The Linux path, part 3
**May '08** Server hardware
**Jun '08** Mac in the mix
**Jul '08** System management tools
**Aug '08** Swing migrations

**You might be handy with a PC, but what if you had to look after the back end of your business? How would you set up and manage the servers, the network and the server applications?**

## Part 8

# Managing your Linux server

**By now, your Linux server is performing all of its main functions. Next, it's time to implement the extra things that will simplify administrative tasks.**

Three issues ago, a walkthrough for the installation of Windows Software Update Services was detailed, allowing all client workstations to receive system updates from your server, as opposed to each having to download these patches from Microsoft. The same thing can be done under Linux by setting up YUM (Yellow Dog Updater, Modified) repositories and configuring all clients to update from this location instead of online repositories. The primary advantage to doing this is to minimise internet data transfers, saving your quota for other things.

The only pre-requisite for setting up a YUM repository on a Red Hat-derived system is a web server — the Apache HTTP Server should already be running on your server as we set this up last month. Aside from that, keep in mind that every update released will be downloaded into your mirror — so you'll also need to reserve at least 3GB of disk space for each architecture and each version that you intend to maintain.

### ALL YOUR BASE...

When creating your mirror, you are essentially creating two repositories. The first is the base OS repository, which contains all of the packages that your installation media holds. This repository will be used by clients when you install new packages via YUM — as opposed to obtaining these packages from the media or online. The second repository is for system updates.

From within your DocumentRoot, create a couple of new directories under a path that identifies which version and which architecture of CentOS you are mirroring — one for the base OS files and another for updates. For instance, the following commands should be issued if you are mirroring CentOS 5.1 on the i386 architecture:

```
mkdir -pv /var/www/html/centos/5.1/os/i386
mkdir -pv /var/www/html/centos/5.1/updates/i386
```

Next, copy the installation RPMs from your CentOS 5.1 CDs or DVD to a subdirectory under the OS directory that identifies what architecture the base installation files belongs to — this way, your mirror is capable of storing installation data for different architectures (many small business networks will often have a mix of i386 and x86_64 workstations). For example, these commands would copy across the i386 installation RPMs:

```
mount /mnt/cdrom
mkdir /var/www/html/centos/5.1/os/i386
cp /mnt/cdrom/CentOS/*.rpm /var/www/html/centos/5.1/os/i386
umount /mnt/cdrom
```

After copying the RPMs across, generate header files for each RPM (the headers for each RPM file contain the list of dependencies, version details and more, and are used by YUM to determine the requirements for installation of any package) using the yum-arch command:

```
cd /var/www/html/centos/5.1/os

yum-arch .
```

After processing, a headers directory will have been created and all header information will reside in this directory.

## ADDING UPDATES

Once your base repository is populated, it should not ever require modification (though you may like to add additional data when a newer version of CentOS is released, or if you plan on supporting additional architectures). Our second repository needs to contain system updates, and the easiest way to retrieve these is to synchronise them with a trusted mirror. This guide will provide instructions on how to use rsync to synchronise with Planet Mirror's servers in Brisbane, but many ISPs have their own unmetered mirrors which may further preserve your data quota.

To manually synchronise your updates repository, execute the following command:

```
rsync --avrt rsync://rsync.planetmirror.com/
centos/5.1/updates/i386 --exclude=debug /var/
www/html/centos/5.1/updates/i386
```

If you are able to successfully synchronise the repository, add the same command as an entry to /etc/crontab so that a synchronisation is regularly performed (eg, you may want a sync nightly at 2:00am). There is no need to generate the headers for this repository as we did for the OS repository because these should be synchronised along with the updates from the upstream mirror.

## PUSH THE LITTLE CHANGES

After both repositories have been populated, you then need to modify the YUM configuration on all systems so that they pull updates and base packages from your new mirror. To do so, edit the /etc/yum.repos.d/CentOS-Base.repo file and:

- comment out the mirrorlist directives;
- modify and uncomment the baseurl directives under the [base] and [updates] sections to point to your repositories. For example, your file should look similar to:

```
...

[base]

name=CentOS-$releasever – Base

#mirrorlist=http://mirrorlist.centos.org/
?release=$releasever&arch=$basearch&repo=os

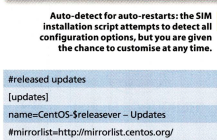
baseurl=http://server/centos/$releasever/
os/$basearch/

gpgcheck = 1

gpgkey=http://mirror.centos.org/centos/RPM-
GPG-KEY-CentOS-5
```




**At a glance: Nagios can show you the status of services and performance counters on many systems from a single web page.**



**Auto-detect for auto-restarts: the SIM installation script attempts to detect all configuration options, but you are given the chance to customise at any time.**

```
#released updates

[updates]

name=CentOS-$releasever – Updates

#mirrorlist=http://mirrorlist.centos.org/
?release=$releasever&arch=$basearch&repo=up
dates

baseurl=http://server/centos/$releasever/updates/
$basearch/

gpgcheck = 1

gpgkey=http://mirror.centos.org/centos/RPM-
GPG-KEY-CentOS-5

...
```

Once you've saved the changes, you can copy the file to all other workstations in your network and perform yum updates quickly, easily and locally.

## IMPROVING THE FIREWALL

During the installation of CentOS, you would have been prompted whether you wanted to enable a kernel-based firewall after installation along with a few basic configuration options. You can reconfigure the settings for this firewall from within the System Settings. The trouble with the default firewall is that it's not exactly flexible; specifically, it does not provide egress filtering (much like the firewall that comes shipped with Windows). APF (Advanced Policy Firewall) is a very good, broad-level Linux firewall script that utilises the same kernel module (iptables) that the default firewall uses — but it's considerably more flexible and extendable. Download the APF tarball to root's home directory, uncompress it and run the installation script:

```
cd
```

```
wget http://www.r-fx.ca/downloads/apf-current.
tar.gz

tar –zxvf apf-current.tar.gz

apf-0.9.6-3/install.sh
```

Once installed, edit APF's config file (at /etc/apf/conf.apf) with all of the values that are relevant to your specific environment. Some of the directives that you will want to be aware of are:

- **DEVEL_MODE** — when this directive is set to '1', the firewall configuration will be used for five minutes, after which the configuration will be flushed from the kernel. This setting is useful to enable when you are making changes to the firewall from a remote system — that way, if your firewall configuration locks you out of the server, you can regain access a few minutes later.
- **IFACE_TRUSTED** — this directive should contain a list of the network interfaces on your system that should NOT have firewall rules applied. If your server has two network interfaces — one that faces your network and the other that faces the internet — you may want to add the internal interface to the trusted list.
- **IG_TCP_CPORTS** — this directive should contain the list of ports that you wish to allow

inbound TCP connections to. In general, you'll only want to enable the ports for services that you have running on your server that you want to be accessed via the internet — 21 (FTP), 22 (SSH), 25 (SMTP), 80 (HTTP), 110 (POP3), 143 (IMAP), 443 (HTTPS), 8080 (HTTP Tomcat) are all good candidates for our small business server.

- **IG_UDP_PORTS** — as above, but for UDP connections. 20 & 21 (FTP) are good candidates.
- **EGF** — when set to '1', this directive will enable egress filtering on the firewall.
- **EGF_TCP_CPORTS** — the list of ports that you will allow outbound connections to be made on. At a bare minimum, you'll want to allow your server to access ports 21 (FTP), 25 (SMTP), 53 (DNS), 80 (HTTP) and 443 (HTTPS).
- **EGF_UDP_CPORTS** — similar to the directive above, but for UDP Ports. You'll definitely want to enable ports 20 & 21 (FTP) along with 53 (DNS).

There are a plethora of other options available and the config file is well commented, so take the time to go through all configuration directives. Once you've finished making changes, save the configuration file and start apf by running:

```
service apf start
```

Keep in mind that if you have DEVEL_MODE set to '1', the firewall will be active for only five minutes.

## ADDING FURTHER PROTECTION

BFD (Brute Force Detection) is another package made by the same author that ties in very nicely with APF. Essentially, it parses your log files and looks for authentication failures. If too many failures occur in too short a time from one net host, the IP address of that host is then added to the list of denied hosts within APF. This prevents malicious users from performing brute-force attacks on your server. Installation of BFD is also relatively simple — download, extract and execute the installation script:

```
cd
wget http://r-fx.ca/downloads/bfd-current.tar.gz
tar –zxvf bfd-current.tar.gz
bfd-0.9/install.sh
```

The install script copies all relevant files to /usr/local/bfd and adds a file named 'bfd' to /etc/cron.d. This latter file instructs the cron daemon to execute BFD checks every eight minutes. A config file for BFD does exist under /usr/local/bfd, but it generally doesn't require modification. If BFD detects a brute force attack, a couple of lines will be added to the /etc/apf/deny_hosts.rules file, which instruct APF to block all connections from the IP address where the attack originated. If an address has been mistakenly blacklisted, you can remove the entry from this file.

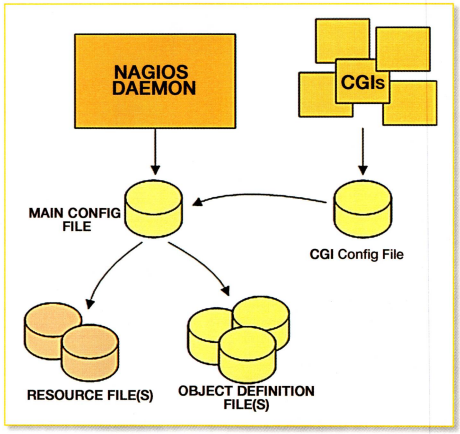
## AUTOMATIC RECOVERY

No application is ever perfect — services sometimes crash, even under Linux. If you have no monitoring systems, you often don't know that a service has crashed until an end user has reported an issue to you. An application called SIM (System Integrity Monitor) can be used to regularly check that services are running, and restart them (or even restart the server) if they have stopped.

The installation of SIM is a little different to that of APF and BFD in that the installation script has a different name and is interactive — you'll have to supply configuration details to the installation script before all files are copied:

```
cd
wget http://r-fx.ca/downloads/sim-current.tar.gz
tar –zxvf sim-current.tar.gz
sim-2.5.4/setup –i
```

The only things that you'll need to know when running the setup script is what services are meant to be running on your system — the script should handle the rest. For instance, if you indicate that you want SIM to monitor the httpd service and restart it if it has stopped, the script should determine the path to the executable and should detect how to restart the service automatically. However, scripts aren't perfect, so you may have to supply these details to the script if it cannot detect appropriate values. If worse come to worse, you can always edit the configuration, which is located at /usr/lib/sim/conf.sim by default. After the setup script has been executed, SIM will perform a check of the system every five minutes based on the line inserted into /etc.crontab.




**Complex configuration: the myriad configuration files for Nagios are classified and linked as shown above.**

## MORE MONITORING

Two of the limitations of SIM are that it only monitors a few services and it only monitors the local host. For instance, SIM will not detect whether OpenLDAP has stopped responding and, as a result, will not attempt to restart that particular service. One of the most popular open-source monitoring systems is Nagios — and it's as flexible and extensible as monitoring systems come. In fact, Nagios is so flexible, it's a little difficult to know where to start. Installation is reasonably quick and painless, but you can spend an eternity configuring and extending it to do just about anything if you so wish.

While RPM binaries for Nagios can be found, the most reliable way to install it is to manually compile it yourself. First, ensure that all of your dependences have been installed:

```
yum install gcc gd gd-devel glibc glibc-common
httpd
```

After your dependencies are installed, create a service account and service group for use by




**Going further: front ends based on RRDTool can be used to graph performance metrics over lengthy periods of time, which can show you what impact various system changes have on performance.**

Nagios and ensure that the apache and Nagios service accounts are members of the new group:

```
useradd nagios
passwd nagios
groupadd nagcmd
usermod –G nagcmd nagios
usermod –G nagcmd apache
```

Next, download the Nagios source and Nagios Plug-ins source tarballs to the root's home directory from **www.nagios.org/download** (this site will redirect you to your nearest SourceForge mirror for the actual download). Once downloaded, extract all files from the Nagios tarball and run the configure script:

```
tar –zxvf ngaios-3.0rc2.tar.gz
cd nagios-3.0rc2
./configure —with-command-group=nagcmd
```

If the configure script runs successfully without error, you can now compile and install Nagios:

```
make all
make install
make install-init
make install-config
make install-commandmode
make instal-webconf
```

Before starting Nagios, you should review the base configuration. All configuration files are located under /etc/local.nagios/etc. Essentially, the main configuration file (nagios.cfg) contains all of the core configuration directives. Towards the top of this file, you'll see that a number of other configuration files — the object definition files — are also called. A detailed guide on how to configure Nagios itself could be a multiple-part Workshop series, so there's not the space to go into detail here. However, **http://nagios.sourceforge.net/docs/3_0/configobject.html** is a good place to start learning what objects can be defined within Nagios and how different types of objects relate to each other.

For the meantime, the only file that requires immediate changes is /usr/local/nagios/etc/objects/contacts.cfg — you'll need to change the email address associated with the nagiosadmin contact definition to a valid email address. This needs to be done so that Nagios knows who to send alerts to should any of the monitored objects go into a warning or critical state.

An account for nagiosadmin then needs to be created within the Apache web server. Access to Nagios should be restricted because you probably don't want unauthorised users to be able to view the status of services running on your network, let alone have the ability to restart them or run other commands on your server.

```
htpasswd –c /usr/local/nagios/etc/htpasswd.users
nagiosadmin
service httpd restart
```

Without the base plug-ins, Nagios can't really check the status of any service. These should be built next:

```
cd
tar –zxvf nagios-plugins-1.4.11.tar.gz
cd nagios-plugins-1.4.11
./configure —with-nagios-user=nagios —with-
nagios-group=nagios
make
make install
```

Once your plug-ins are good to go, you can add Nagios to the services list, verify the configuration and then start Nagios (assuming that your configuration is valid):

```
chkconfig —add nagios
chkconfig —level 2345 nagios on
/usr/local/nagios/bin/nagios –f /usr/local/nagios/
etc/nagios.cfg
service nagios start
```

Point your web browser to **http://server/nagios**, log in, and you should see a few basic service checks being performed on your local server. If you occasionally get 'Internal Server Errors' when viewing Nagios, your SELinux settings may need tweaking. To instruct SELinux to permit the execution of the CGIs needed to generate some Nagios pages, execute the following commands:

```
chcon –R –t http_sys_content_t /usr/local/nagios/
sbin/
chcon –R –t http_sys_content_t /usr/local/nagios/
share/
```

Once your base configuration is running, experiment and expand. With a bit of scripting nous and effort, Nagios can monitor just about anything (for instance, I personally have an instance of Nagios that checks the Bureau of Meteorology's radar loops to determine if a severe storm is approaching my house, and sends an SMS alert to me if it detects one).

## TRENDING

With any luck, you have a server that operates in a stable and reliable manner and you have implemented tools that should automatically restart services if they fail, or message you to indicate that something is wrong well before users report problems: it's always a good feeling when you fix severe problems before anyone else realises that something's amiss. If you want to go even further, have a look at RRDTool and some of the front ends to RRDTool (such as Cacti). These tools provide the ability to graph performance metrics over time, which can help identify long-term issues on your server and can help provide a picture of server health and capacity. LTUE

## NEXT MONTH

**In next month's Masterclass, we consider the folk who use Mac OS X and how they can work in the two small business server environments that we have created.**

# Build a Blu-ray Phaser

**Convert a toy *Star Trek* Phaser into a working laser gun. But watch your eyes!**

## REQUIREMENTS

- **STAR TREK CLASSIC PHASER**
  The 40th Anniversary Art Asylum one is best.
- **BLU-RAY TRANSPORT**
  For giving this project light.
- **SOLDERING IRON, SOLDER AND DESOLDERING BRAID**
  You'll need to desolder the Blu-ray diode. Use a low-power soldering iron with a small tip.
- **DIODE HOUSING**
  This keeps the diode cool and pointing in the correct direction.
- **HELPING HANDS**
  The diode is tiny, so a mini-vice or a set of helping hands is invaluable.
- **100-OHM POTENTIOMETER**
  This drops the 4.5V supply from the pistol to a safe voltage for the diode. Alternatively, you can buy a power regulator.

Replica *Star Trek* Phasers are quite cool, in that they light up and make authentic Trek-like beeps and squeals, but they lack one crucial factor — a Phaser beam. For the under-12s, it's easy to use the imagination, but like most great toys, the Phaser we're making is not a toy.

There are a number of different *Star Trek* Phasers available, and you can hack all of them. We used a *Star Trek: The Original Series* Black Handle Phaser. The model we used is copyrighted to Art Asylum (**www.artasylum.com**) and manufactured by Diamond Select Toys in China. The Art Asylum model splits into the black Type-I Phaser, which holds the batteries, and the power pack, which is the blue-grey pistol beneath. This Phaser is a lot easier to work with than some of the other models, because the electronics are kept in the black Type-I Phaser that plugs into the top of the pistol.

Red lasers are cheaper and easier to find than blue. If you hunt around, you should be able to find an old laser pointer for just a few dollars. The laser we used was cheap because it's part of the PS3 Blu-ray caddy. This does have a couple of implications: you'll have to carefully remove the laser diode from the caddy, and the diode itself will need some form of housing once removed.

### HARVEST THE BLU-RAY

Begin by removing the laser diode from the Blu-ray transport. The driver is located on the side of the sliding part of the mechanism and is held in place with two tiny screws and connected to the circuitry with a ribbon cable. Remove the screws and the small foil clips held in place there to get at the ribbon cable and cut it away. With the cable cut, you can wriggle the diode free from the housing; it's a very snug fit, as the housing also serves as a heat sink, so you must be extremely careful. Take your time when working with the diode, as it's very delicate. When you finally ease the diode assembly free you'll need to remove the diode from the clip. Two tiny blobs of glue, at the top and bottom, hold it in. Scrape these away carefully and push it out. It takes a little force to get it free, take your time and be careful, or you may find yourself buying a new Blu-ray transport.

As soon as you remove the diode you should put it into a housing. You could use an Aixiz housing, with the laser out of the clip that's still connected to its circuit board. You need to remove this using a soldering iron and a desoldering pump or braid. Make sure your diode is encased in its housing before you do this.

The laser housing performs two functions: it protects the diode and serves as a heat sink. Some housings also provide a nice socket for your diode to sit in. The recommended housing is an Aixiz 650nm 5mw 12 x 30mm case. These are available online from **www.mfgcn.com**.

If you don't want to buy a housing from America, you could make your own. A five-cent piece (or penny) will fit perfectly into the Phaser housing, but you'll need to drill a 3.5mm hole directly into the centre of it. We used a 3mm bit and carefully opened it up until the diode fit snugly. Or, you could also use a 4mm bit and pack the surrounding hole with a small amount of folded aluminium foil. It's very important that the diode fits snugly, so that heat can transfer to the housing. Make sure this is the case before you start on the desoldering. Use a pump or braid to remove as much solder as you can. If you aren't too skilled in this art, you can get most of the solder off and gently prise the board up

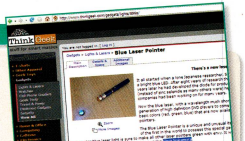
## SPOTLIGHT ON... BLUE LASERS

The Blu-ray laser used in this project is not technically a blue laser. It produces light at 650nm, which is just between the violet and ultraviolet ranges.

To laser afficionados the Blu-ray laser is a poor substitute to a real blue laser. Its beam isn't as obvious to the naked eye and needs to be picked out by smoke or haze. Think Geek, for example, sells a blue laser pointer at a 473nm wavelength that produces a strong blue beam.

You may be forgiven for thinking that the humble 650nm Blu-ray diode is not very good, but that would be a harsh criticism when you take into account the costs involved.

Our Blu-ray Phaser, if you buy an expensive driver, costs at most US$115. Think Geek's pointer costs around US$900. Perhaps if you really needed the geek points, or wanted to present on a surface a mile away, the cost would be worth it, but probably not.



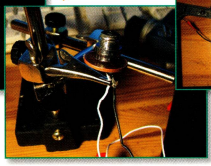

**If you want to buy a blue laser, expect to dig deep. Think Geek will sell you one for around US$900.**



The tiny beads of glue must be removed before you try to push the diode out of the clip.



Holding the diode in the housing while you solder will give added protection against overheating.



The laser diode needs a lens to focus the light into a parallel beam. A coin is the perfect foundation.



More batteries mean more power, but if you add more than two, a variable resistor is crucial.

with a small knife while the solder is liquefied. With the diode now removed, you should strip down the pistol ready for the next step.

### INSTALL THE DIODE

To install your diode, you're going to have to tear down your Phaser. This is relatively simple, as it's only held together with three screws. Remove the black mini-Phaser from the top of the pistol and put it to the side. What's difficult is getting to the ones in the front and rear of the pistol. The rear one is easier; you have to unclip the silver endpiece. This is very stiff but it will prise out with no damage to the pistol. The front part is more difficult, as you have to get a screwdriver under the rotating cap and unclip both sides. The final cap is at the bottom of the pistol grip; it's tight but will come off without any risk of damage.

With the caps off you can remove the three screws and open the Phaser. You'll find an LED with the positive leg soldered to a switch, and the negative soldered to a wire that's attached to the other half of the pistol. Desolder both of these and remove the LED. You're now ready to install your diode and resistor.

First, solder the diode into the Phaser's circuitry. As well as the diode you'll need a small potentiometer to adjust the amount of current that the diode receives. Too much current and the unit will either burn out instantly or it will have a lifespan of just a few hours. We soldered a small 100ohm Sub-Miniature potentiometer between the switch and the positive leg of the diode. Then we soldered the negative leg to the negative wire on the other side of the pistol casing. Use a couple of inches of thin wire to connect the components.

If you used a coin for the diode housing, then you will find it slips perfectly into the housing just in front of where the LED used to sit. If you used an Aixiz housing, you may have to mess around a little to get it to line up.

Use a tiny blob of hot glue on the back of the diode to hold it to the coin or housing, and another tiny blob to hold it to the Phaser housing. Close the sides together, replace the black Phaser part and pull the trigger. Your laser should light, and it should be dull. If not, take the Phaser apart and make sure the potentiometer is at full resistance. You can tune it up to an acceptable brightness later. With the laser shining dully you can check the alignment of the laser out of the front of the pistol. If it's off, change the alignment inside the Phaser and hold it in with yet another small blob of hot glue. Repeat the process until you're happy that the laser goes where you point.

The front of the Phaser comes with a shaped piece of acrylic for the muzzle. It makes it a lot easier if you remove this, or replace it with a tube. If you have a lot of time on your hands, polish the internal end or drill through it, and try to shine the laser through. With the laser aligned, you can hot-glue the housing in place and concentrate on fine-tuning the intensity of the beam. Either make a small hole and hot-glue your potentiometer to it, to allow tweaking from outside the Phaser, or just disassemble it each time. Keep tuning it up until the laser is making a nice strong beam, then put the Phaser back together and have some fun. Just be careful not to blind anyone. ET LC

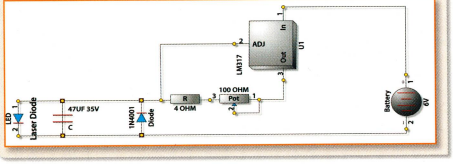
## DO THIS... INSTALL A POWER REGULATOR

Just putting in a resistor will extend the life of your laser, but it's by no means the perfect fix. The intensity of your laser will degrade as the power drains from your battery, and you may get voltage spikes when you pull the trigger.

The addition of a small capacitor will deaden the spikes, but it won't fix the dulling of the laser's intensity over time. There is a wide range of enthusiast and professionally made driver boards available on the market, and if you want to get the full 10,000 hours' life from your laser, then it's certainly a good idea to install one.

Daedal, on the Laser Pointer Forums, has been kind enough to produce a schematic for a homemade driver in this forum thread: *http://tinyurl.com/3ay427*. If you don't want to make your own driver, tiny units suitable for driving the Blu-ray diode are available for around $30, such as the NS102, available from *www.nvginc.com/ns102.htm*.

**You can make your own regulated driver, but it's easier to buy one.**



# Network sharing in Vista

**Sharing resources between Vista and XP machines can be tricky but it can be conquered securely, says *Joe Cassells*.**

## REQUIREMENTS

- **TWO OR MORE PCs**
  One PC from your network should have Windows Vista installed.

## INSIDE INFO

- *Wireless Networking with Microsoft Windows Vista* by Michael Miller provides an excellent overview of home networking using Vista-based PCs.
- For more information on tightening up your network and protecting your Vista boxes, check out *Windows Vista Security For Dummies* by Brian Koerner.
- For more help online, you can find advice and technical help setting up a network using various flavours of Windows at Windows Networking: **www.windowsnetworking.com.**
- There are also several useful step-by-step guides to networking and sharing in Vista at the Windows Help web site: **http://windowshelp.microsoft.com/Windows/en-US/networking.mspx.**

Networks vary from a couple of PCs linked together — to commercial giants with thousands of nodes. Networks for homes and small offices are pretty easy to set up and they allow you to share resources like printers, files and a broadband connection. Windows Vista provides a bunch of new networking features, but it does things a little differently from XP, and so the two operating systems don't always perform together on a network as smoothly as you might expect. However, with a little thought you can put together a network that uses the best of Vista's sharing features while retaining the essential security necessary nowadays.

### CONNECTING UP

Your first job is to ensure that you've got basic connectivity. Most PCs have built-in network adaptors for wired connections and pretty much all recent laptops have both Ethernet and wireless connections available. The choice of networking medium at home tends to be wireless due to its convenience and lack of cables, but there are reasons to opt for wired/power line connections instead. Wired networks are generally more secure than their wireless counterparts and they can carry significantly higher bandwidth. These concerns might not bother a home user wanting to link a few family computers together, but for an office handling significant quantities of sensitive data, they are highly important considerations. One other reason for eschewing wireless networks is reliability. Interference from neighbouring networks and domestic equipment using similar frequencies can hit performance, and it's not uncommon to need to reboot access points and wireless routers periodically due to random outages.

These considerations remain the same whether you're putting together a network using XP or Vista. Before your network will function, you need the right equipment in place. In the case of wired networks it's a hub or switch, network adaptors in each computer connected to it and a router for internet access. For wireless networks it's wireless adaptors in the PCs and an access point or router to connect to. It's possible to construct networks without using a router for internet access, but the basic protection offered by the NAT firewall in most routers makes them the best option for you.

Getting the equipment set up should be a no-brainer. Plug it all in and install driver software where necessary. Browse to the router's IP address using a browser on one of your PCs and enter your ISP connection details to get online. If everything's set up correctly, each computer should be able to access both the router and the internet beyond it.

### GROUP CONNECTION

What we're interested in from here is getting the computers to see each other so that they can share resources. In Windows XP, you should be able to see any shared network folders by choosing Start > My Network Places. Opting for 'View workgroup computers' in this screen should show you the other PCs connected to the network. Things are a little different in Vista; everything network-related is dealt with in the

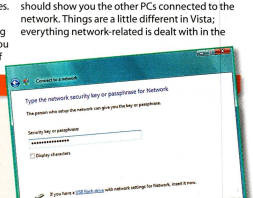
## HANDY TIP

**If you have mixed computers in a workgroup, remember that the default workgroup name used by Windows XP is MSHOME, whereas in Vista it's WORKGROUP. Change your XP workgroup by right-clicking My Computer, choosing Properties and selecting Computer Name. Click Change and enter the new workgroup name in the relevant field. Click OK twice and restart the PC.**

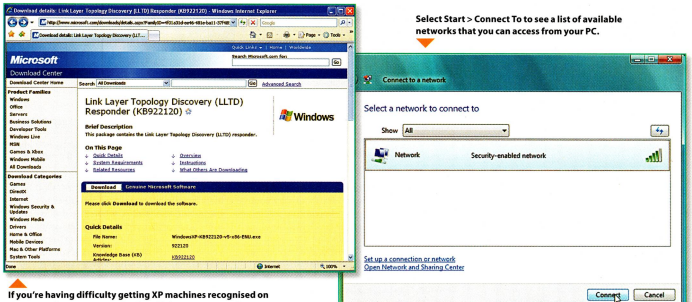
## DO THIS... SET UP A SECURE WIRELESS CONNECTION

**Unlike Windows XP, there's no Wireless Network Setup Wizard in Vista; instead it's covered in the general Connect to a Network dialog. The simplest way to get to it is probably Start > Connect To. Use the Show drop-down list to specify what networks to display. You can opt to see Wireless, Dialup and VPN or all three. To add a wireless network, ensure that Wireless or All is selected and choose what you want to connect to. If you can't see it, select 'I can't see the network I want to connect to' and choose 'Manually set up a wireless network'. You can now supply the SSID, encryption method and passkey.**

**This lets you connect to a network that isn't broadcasting its SSID, as long as you know the authentication details. If your router lets you turn off SSID broadcasting, this is a good idea, because it prevents passing people from seeing your wireless network and hence reduces your chances of being hacked. Which security system you use will depend on your hardware's capabilities. Where possible, choose WPA encryption and use a passphrase for authentication. Make it at least eight characters long and ensure that it doesn't start or end with a space.**




**For authentication, use WPA encryption and a passphrase.**




**If you're having difficulty getting XP machines recognised on the network, you may need to install the LLTD responder.**

Network and Sharing Center. This is the hub for network settings in Vista and you can get to it by choosing Start > Control Panel > Network and Internet > Network and Sharing Center. In the left-hand pane, there are a number of common networking tasks, like viewing computers and devices on the network and manually setting up a connection. You'll find an invaluable option here is Diagnose and Repair. Select this if you're experiencing network problems but can't work out what's causing them. Vista will scan your network for common issues and will then offer to fix any that it finds.

## NETWORK DISCOVERY

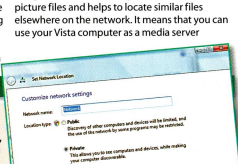
The Network and Sharing Center shows you at a quick glance your main sharing settings in a section called Sharing and Discovery. This includes six key settings that can be turned on or off. The status of each is shown in this screen with a green light indicating which services are on. The first, Network Discovery, lets you see other PCs connected to your network and ensures that they can see your PC. It also affects your ability to share resources with others and to see other available resources. In some cases, you'll want to ensure that Network Discovery is on, so click the downwards arrow next to it, select Turn on Network Discovery and click Apply. However, you may want to choose to turn it off if you don't want other computers to easily see your shared files.

The File Sharing setting allows you to share files, folders and printers on this PC with other computers on the network. For another computer to be able to access a folder on your PC, this will need to be turned on and you'll need to share the folder itself. Public folder sharing is similar to file sharing, but it provides others with access to the specified public folders on your computer. You can opt to give read-only access or full control to the files in these folders. For a simple way to make a file accessible on the network, turn on this setting and drag the file into your public sharing folder.

> YOUR FIRST JOB IS TO ENSURE THAT YOU'VE GOT BASIC CONNECTIVITY

Printer sharing lets you give other computers access to this computer's printer. For someone on the network to be able to print using a printer connected to this PC, you'll need to turn on printer sharing and share the printer itself. Password-protected sharing adds another level of security to your shared folders. When this is turned on, people attempting to access shared files will need to provide a username and password for a user account on this PC. For the widest availability of your files, turn this setting off, but it's worth using if you're connected to a large network and you want to keep control over who has access to your files.

Finally 'Media sharing' provides network computers with access to your music, video and picture files and helps to locate similar files elsewhere on the network. It means that you can use your Vista computer as a media server




**The public and private network locations provide a quick way to apply security settings.**

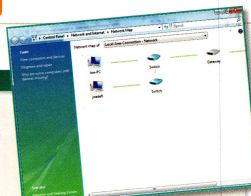
## SPOTLIGHT ON... NETWORK LOCATIONS

You can use network locations in Vista to quickly and automatically adjust security and sharing settings to suit the most common network scenarios. You can choose one of three locations: Public is when you've connected to an open public hotspot or other similar location, where you want to get internet access but you need to restrict others from accessing shared files and folders on your computer. The Private location covers times when your computer is connected to a network that is behind a NAT firewall, as provided by most routers. You can afford to share resources more freely and may need to do so at some points; this setting is typical for home users and people who use small office networks. The final location is called Domain, which is set up for times when your PC is connected to a commercial network or one that uses a domain controller. You'll only find the last option in business versions of Vista and it's generally set up by admins. To change your network location when needed, choose Start > Network > Network and Sharing Centre. Click Customise next to your network name and use the radio buttons to select the location type that you want to use. Click Next and Close.

## SPOTLIGHT ON... NETWORK MAP

**You can use the Network and Sharing Center to produce a network map that shows the detected devices on the local network and where your computer is in relation to them. The map is in network terms and so simply shows which devices are connected to what, not their physical location. To see the map, open the Network and Sharing Center and click View full map. Windows then interrogates the local network and provides details of the computers, switches and gateways in use.**

**This is very handy for troubleshooting purposes because you can see which devices are detected and which aren't. Windows XP computers without the Link-Layer Topology Discovery responder installed won't show up on the network map. See the main text to find out how to install this. Software firewalls may be responsible for other devices not appearing. You can confirm this by temporarily disabling the firewall on computers that have been affected by this.**



**The network map shows currently running devices and where they are on the network.**

without the hassle of complex configuration.

Despite the ease with which you can share files and resources in Vista, there are some common network problems that arise, particularly when using a mixed network. Windows XP machines may not be able to see Vista computers and vice versa because the default workgroup name is different. You need to ensure that this name is the same in each of your PCs. To change the workgroup in XP, go to Control Panel and open the System applet. Click the Computer Name tab and select Change. Enter the new workgroup name, and click OK. In Vista, open the System applet in Control Panel and click Change Advanced Settings. Select the tab marked Computer Name and click Change. Provide the new workgroup name and click OK. In both cases, you'll need to restart the computer before the changes you have made will take effect.

### LINK LAYER

You could have problems with Vista and XP computers seeing each other if your XP machines don't have the Link-Layer Topology Discovery service installed. To fix this, download and install the LLTD Responder component from **http://tinyurl.com/2b3lkn**. You need to validate your installation of XP before you can download it. Once you have this installed, you can verify that it's up and running by choosing Start > Control Panel > Network Connections. Right-click your local area connection and choose Properties; you should see an entry for Link Layer Topology Discovery Responder. Make sure it is ticked. Once you have the LLTD responder installed on your XP computers, you should be able to see them from Vista machines. You can also use the Network Map to see what position they take up in your network.

When you have file and folder sharing turned on, you also need to share the folders that you want to make available to others on the network. To do this, browse to the folder that you want to share using Windows Explorer. Right-click it and select Share. This opens the 'File Sharing' dialog. You now need to specify who you want to share the folder with. If you have password-protected sharing turned off, you can share the folder with everyone on the network if you choose Everyone. Otherwise, pick the user accounts that you want to give access and add them to the sharing list. Click Share to confirm these settings.

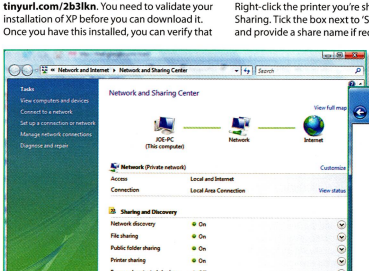
### SHARING PRINTERS

Sharing a printer is a similar process. Choose Start > Control Panel > Hardware and Sound > Printers. Right-click the printer you're sharing and press Sharing. Tick the box next to 'Share this printer' and provide a share name if required. By default, Vista supplies the printer name as installed. Select 'Render print jobs on client computers' to reduce the overhead on this PC when they opt to print using your printer. When another PC connects to your printer, it will install the print driver from your PC. Click 'Additional drivers' if you need to make Itanium and 64-bit drivers available. You'll be prompted to install these when you click OK.

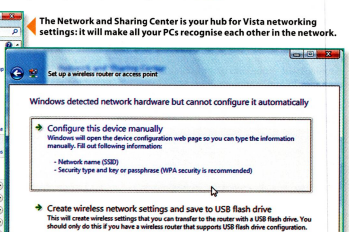
To use shared printers in another computer, install them as a network printer. Select Printers in Control Panel and opt to add a printer. Choose network printer and browse to the machine you want. The PC connected to that printer will need to be turned on for you to be able to see it here. Complete the wizard to install the driver locally.

If you need speedy network performance and you don't need to share printers, you can claw back a little speed by turning off printer sharing. This is because, when you're browsing shared folders, Windows Explorer can slow down while it looks for shared printers. To turn this off choose Start > Network > Network and Sharing Center and next to 'Printer sharing' click the icon.

One final check you can make to ensure that your computer is properly connected to the network is to open a command prompt by entering 'cmd', followed by return in the Start menu search bar. Now type ipconfig /all to see your IP address and other essential network configurations. ETLP




**The Network and Sharing Center is your hub for Vista networking settings: it will make all your PCs recognise each other in the network.**




**It's possible to set up some routers from within Vista, but most need to be manually configured using a browser.**

# Secure Linux routers

**We're used to using Linux as a firewall, but just a few extra steps can turn it into a secure router, says *Graham Morrison*.**

## REQUIREMENTS

- **LAN**
  Obviously, this project doesn't make any sense if you don't have your own Local Area Network. It can be wired or wireless.
- **SWITCH**
  Each device on your network needs to have direct access to your Linux machine, and the easiest way to achieve this is through the use of a network switch.
- **AN OLD PC**
  If you followed our firewall tutorial (*APC* March, page 106), you could use the same machine without losing any functionality.
- **PC SPEC**
  You need only a small hard drive (4GB), and 512MB of memory is more than enough. You can also get away without the keyboard, mouse and monitor if you're happy to configure the machine remotely (after installation).
- **SMOOTHWALL EXPRESS**
  This is the Linux installation we used for the Firewall project, but it's also flexible enough to be coerced into a router configuration. SmoothWall needs to be burned onto a CD.

Last month we built a firewall using an old PC and a Linux distribution called SmoothWall Express. We wanted to resurrect a machine and put it to work doing something useful on our network, filtering packets and blocking nefarious applications and utilities sending data to and from the internet. Building a secure router takes this idea to the next stage, adding other functions to the firewall configuration that you'd typically find in a router.

A router, in the traditional sense, is a device that connects two sub-networks together, mapping an address on one network to addresses on another. They are the domain of company and corporate networks, where routers become large parallel processing machines that need to deal with colossal workloads as data moves from one network to another. As a consequence, companies such as Cisco make a fortune selling solutions that are up to the task, and it requires a lot of skill managing installations of this scale.

### BUDGET ROUTES

However, we've also got used to thinking of routers as those small boxes given to us by our internet provider to bridge the connection between the internet and our local or home network, and sometimes add wireless connectivity. These devices are rarely routers in the same sense as the machines connecting together Google's gargantuan network of parallel processing search munchers, though they do offer some of the same functionality. They really should be called 'Residential Gateways', because this is their real function. They translate addresses from machines connected on the LAN to an individual address used on the internet, since a home internet connection will only usually have a single IP address. When a remote connection is made and this connection needs to connect to a machine on your LAN, it's the gateway that's managing the connection that forwards the packets to the corresponding device on your network. However, you could consider such a device a router if you frequently access machines on the wireless network from your wired network, or vice versa.

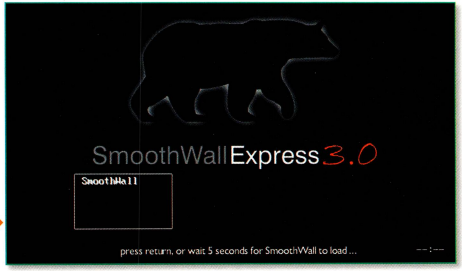
For the sake of general functionality, we're going to build a router that has more in common with a residential gateway than a Cisco 7206 as this is going to be of most use to the vast majority of people. If you look at the most common functions you find in a home or small business router, you'd expect to find the following:

**DHCP:** This is the service that assigns an IP address to each device on your LAN.

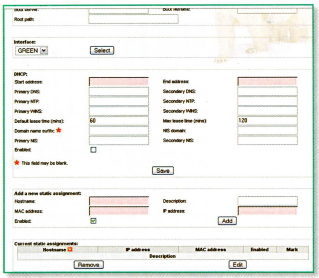
**NAT:** Network Address Translation means devices on your LAN can access peer-to-peer services as if they had their own IP address — think more instant messaging than BitTorrent.

## HANDY TIP

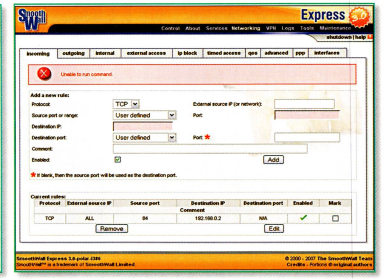
**If you're looking for a solution that's a little more advanced, then it's still possible to use Linux at the heart of an enterprise-class router. For this to work you'll need to get used to using the command line and manually editing instructions for the kernel to change its network routing table.**




**Turn an old PC with a network card into a secure router to manage all your home or small business network needs using SmoothWall Express.**




**When entering details into SmoothWall, the light pink background means a field needs to be filled.**




**Port forwarding is like connecting virtual cables from one port to another, keeping your PCs secure.**

**Port forwarding:** Commonly used for games, VoIP and media streaming. This is one of the more important jobs for a router, because it means you can spread services transparently across your LAN. If you run a web server on a certain machine, for example, forwarding port 80 to this machine makes it appear as though this machine is running from a single IP address, when it's really the router.

**VPN:** You most often come across these when you need to work from home and access your business intranet. VPN is like a bundled port forwarding application, bridging an entire network to your LAN securely.

**Firewall** Packet filtering and port blocking. We covered these functions last month.

We won't look at installing SmoothWall as it's fairly straightforward, and the only thing that might be different is the number of network controllers you need to configure. With a firewall, you need a NIC for each network because the server is the security. With a router, you can get away with connecting a switch to the network port on your computer and just configuring your machine with a single network card. If you have any problems, there's a PDF that comes with SmoothWall Express, and this should tell you anything you need to know. When installation is over, you configure SmoothWall Express by pointing your web browser at the IP address of the machine you've just configured as a router, using either port 81 for a standard HTTP connection or port 441 for a secure HTTPS connection (**https://192.168.0.1:441** or **http://192.168.0.1:81**, for instance). You will then be greeted with the login window. To gain entry to the main panels, you'll need to use 'admin' as the username, and the password you used when installing SmoothWall Express.

## DHCP

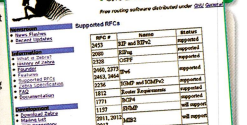
DHCP is an important part of any LAN, because it allows you to forget about the arduous task of assigning IP addresses to each device on your network (and keeping them up to date!). DHCP is the protocol that does this for you automatically. In SmoothWall, the DHCP server is switched on by selecting 'dhcp' from the Services menu at the top of the page. The first thing you need to do is choose the network connection you want to manage. This is accomplished using the colour-coded network interface list, and it gives you the ability to assign two different network ranges to each subnetwork you may be managing.

To do this, select the interface and enter a start and end address for the range. This might be something like 192.168.1.40 — 192.168.1.100, but this is entirely depending on how you want to configure your network. You obviously need to have enough addresses in the range to cater for every device connected to the network. You will also need to add a DNS entry, and this will be the same as the value provided by your ISP, unless you're running a DNS on your LAN.

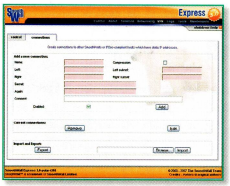
If you have any devices that you'd like to have a static address, then these can be added manually in the lower panel. You will need to create a hostname for each, as well as enter the MAC address and the IP address

## SPOTLIGHT ON... LINUX ENTERPRISE ROUTERS

If you're looking for a more serious solution and something that will scale better to meet enterprise demands, you will need to look at a more ambitious solution. Enterprise-class routers are complicated, and use their own protocols for communication. One of the most popular pieces of Linux routing software, 'Gnu Zebra', serves up TCP/IP protocols like RIPv1, RIPv2, RIPng, OSPFv2, OSPFv3, BGP-4, and BGP-4+, just like the big boys. But you also need the specialist skills of a router sys admin to get any meaningful results. Another popular alternative is called 'FREESCO'. This is short for Free Cisco rather than anything to do with the SCO Group, and it aims to provide some of the functionality you'd typically find in a Cisco router. The most amazing thing about FREESCO, though, is that it fits on a single floppy disk (remember those?), although you could just as easily put it on a cheap USB flash memory stick if you've thrown all your floppies away. It's still being developed, and currently supports Ethernet bridging and routing, as well as NAT. It also has a built-in firewall, along with HTTP, FTP, DHCP, DNS, NTP and SSH servers, configured through a simple set-up utility. Pretty amazing for something that's less than 2MB in size. It manages to do this by using an ancient Linux kernel (things were smaller then), but this means that your router hardware will need to be equally old: it doesn't support USB, for instance.




**Zebra is a cheap alternative to a Cisco router, but it hasn't been worked on for a while.**



**Run SmoothWall on both home and remote networks, and you can link them via VPN.**

you'd like the device to use. For an internal network, the hostname can be anything you want, but IP addresses will have to fit into the sub-network you're using for the interface (192.168.1.40 would work, following our previous example).

After DHCP has been configured, any devices connected to the same network will take their IP addresses from your router. For this reason, it's important you disable any other DHCP services on your network, such as another router or a Windows server.

## NAT AND PORT FORWARDING

SmoothWall performs NAT transparently. If you set your Windows machines to use your router as the gateway and the DNS, you will be able to access the internet through the router without any further problems. If you need to create specific rules for certain addresses on your network, then you need to look at port forwarding. The pages for managing all port forwarding rules can be found in the general networking page. If you have similar functionality in your current router, then you won't encounter any surprises with the SmoothWall implementation. Incoming forwarding is more common, and most outgoing packets are usually left unaffected. If you're running a business network, then it's also likely you'll be using a DMZ (labelled in orange in SmoothWall) for any of your internet-facing servers. In this case, port forwarding is used to connect external services to the machines running in the DMZ. On SmoothWall's incoming page, you can select a predefined range of ports using the drop-down list or create your own by leaving this as 'User Defined'. For all the common services, such as FTP, SSH, HTTP or LDAP, use the preset list as this saves hunting out the port ranges yourself. For any others not in the list, you first need to know the range of ports your service requires. There are two protocols, TCP and UDP, and either of these can use a number of ports, which you have to add one at a time. These networking pages let you create similar connections for services between each network interface you have connected to your router, and the reason why this is so secure is that nothing is switched on by default.

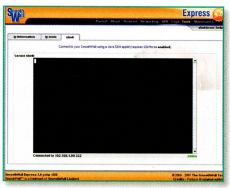
The external access page also lets you access the SmoothWall server from the internet. While there isn't any particular problem with this, it opens up a potential security problem: anyone will be able to have a go at guessing your password. If you need to access SmoothWall from the internet, we'd recommend using SSH to connect to a machine on your LAN, and tunnelling port 441 back to your remote machine.

## PN

SmoothWall supports several different VPN technologies, including pre-shared keys and IPSec, but before you can use the connection, you need to configure it from the VPN > Connections page. Starting from the top, you first need to enter a name for the connection, followed by either enabling or disabling the compression toggle (useful for low-bandwidth connections).

The next section is split into Left and Right fields. These represent the local and remote networks that you want to bridge with the VPN. In the Left field, you need to enter the public IP address of your router. This is easier if it's a static address, but if you have to use a dynamic address with your ISP, you will need to change this value each time.

Next, enter the network address for the local subnet in the Left subnet field. Using our previous example, this would be 192.168.0.0/24 (/24 represents the regular class C subnet). You now



**For a command prompt, select Shell from the tools page. It needs Java and the SSH server running.**

need to enter the values for the Right network — the remote network you want to bridge to your LAN. The values will be similar but are entirely dependent on the remote network's configuration. Then enter something called a 'secret string'. This is used to authenticate the two connections, and should be longer than 20 characters. Finally, click 'Add' to finish the connection configuration. You should now be able to start the VPN connection using your VPN client. If you're thinking of setting up your own VPN, then use two SmoothWall servers as the gateway for each network, and the VPN will connect automatically. You can even save the VPN settings to an external file and move this file to the remote machine to avoid typing the same details again.

We've now got pretty much all the router functionality we wanted covered with SmoothWall. Perhaps the only thing missing is proper logging functionality, but this is easy to find in the SmoothWall Express web interface. There are also some excellent network analysis tools so that you can monitor exactly how your network is being used. It might be a good idea to watch your network being used for a few days, or even a week, before coming up with any quality of service strategy or adding rules to the installation. You will then be able to improve your network's performance before binning your old router. LXF

## DO THIS... TUNNEL WITH SSH

**Despite sounding rather technical and specialist, tunnelling your connections using SSH is actually a really easy technique, useful in all kinds of circumstances. What it does is take a port on a remote network, tunnel the data that's transmitted on this port through the SSH connection and present this data to a local port on a local machine. For example, your company intranet might be accessible only while you're sat at a machine running on your company LAN. But if you want to access your intranet from elsewhere on the internet using an SSH tunnel, you'd connect to a machine on the company LAN and tunnel port 80 (HTTP) from that machine to port 8080 (for example) on the local machine. You could then point a browser to *http://localhost:8080* on the local machine and see your company intranet. The format for the tunnel command is the following:**

```
ssh -N -L 8080:localhost:80 remote_address
```

**You can also use the excellent Windows Putty client to create tunnelled SSH connections. Create an SSH connection and make sure you can connect, then scroll through the category list on the left in Putty and find SSH > Tunnels. You then need to place the remote machine address and port in the 'Destination' field (remote_address:80 in our example), and the local port in the source port field (8080). Click 'Add' and save the connection profile. Each time you now connect with this profile, the remote port 80 will be tunnelled to 8080 on your local machine. You can do this with almost any service you can think of, as long as you know the ports it uses. Samba, NFS, music streaming and instant messaging can all be tunnelled through SSH, and it's a great way of getting around restrictive firewalls, since the only port you're using through the network is SSH port 22.**

# Create CAPTCHAs in PHP

***Robin Nixon* shows you how to easily verify that a human is filling in your web forms.**

## REQUIREMENTS

- **WEB HOSTING**
  This project can run on a local PC, but, unless you have it configured as an internet server, it's recommended to use a web hosting account.
- **PHP (VERSION 4+)**
  A server-side scripting language for creating HTML and other output.
- **GD GRAPHICS LIBRARY**
  An open source code library for the dynamic creation of images.

## INSIDE INFO

- Official Captcha site **www.captcha.net/**
- GD Library Functions **http://php.net/gd**
- Free Fonts **http://1001freefonts.com**
- Hashing functions **http://en.wikipedia.org/wiki/Hash_function**

With the advent of sophisticated 'bot' technology, it's no longer easy to ensure you have an actual human being filling in your forms. There are bots for everything these days, from inserting comment spam into blogs and creating throwaway webmail accounts to spamming via email, or even hacking your web server to turn it into (you guessed it) the newest unwitting member of a spam botnet.

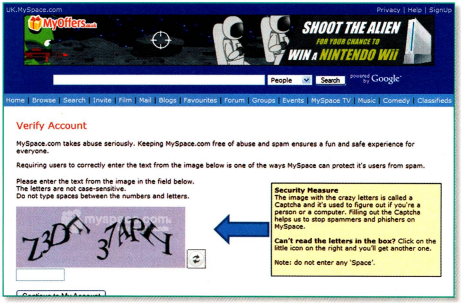
Various techniques have evolved to try and separate bots from humans, such as asking a simple question that only a person would be able to understand and give the answer to. But the simplest and easiest to use is probably the CAPTCHA system, a somewhat contrived acronym for 'Completely Automated Public Turing test to tell Computers and Humans Apart'.

You'll find CAPTCHAs all over the web, and almost everyone will have come across at least one type. But how can you add your own CAPTCHAs without having to install third party plug-ins or libraries, and without having to control session cookies or know a lot about PHP or Perl programming?

The answer is 'not easily', but, if you understand the basics of PHP, you can use this tutorial to provide a basic form of protection for your web forms. And with a bit of tweaking you can customise your CAPTCHA program exactly to your requirements.

### THE PROGRAM

There are two code segments in this tutorial.




A short one and a very short one! So let's start with the longer segment:

```
<?php
$captcha=substr(md5(rand(0,65535
)),rand(0,27),5); $gifname=substr(md5(rand(0,6
5535)),rand(0,27),5); $check=md5("SecretWord$
captcha ");
$font="font.ttf";
$size=imagettfbbox(24,0,$font,$captcha);
$width=$size[2]+$size[0]+6;
$height=abs($size[1])+abs($size[7]) +5;
$im=imagecreatetruecolor($width, $height);
$bg=imagecolorallocate($im,255,2 55,255);
$fg=imagecolorallocate($im,0,0,0);
imagefilledrectangle($im,0,0,$widt
h,$height,$bg); imagettftext($im,24,0,2,abs($siz
e[5] )+2,$fg,$font,$captcha);
imagegif($im,"$gifname.gif");
imagedestroy($im);
echo <<<_END
<img src=$gifname.gif align=left> Please enter
this text<br>
into the box below.<br>
<form method=post action=next. php>
<input type=hidden name=check
value=$check>
<input type=hidden name=gifname
value=$gifname> <input type=text
name=captcha size=20>
<input type=submit value=Submit>
</form>
_END;
?>
```

This code should be inserted in any .php page where you have a web form that you want to protect. If you have suitably configured your server to support PHP on all HTML pages, then you can use this code anywhere on your web site.

Before describing what's under the hood, it's useful to explain the concept behind this code that makes it so easy to use.

**Most large web sites such as MySpace require visitors to pass a CAPTCHA test before they can register, and now so can you.**

There are a number of requirements in the CAPTCHA validation process. In order to verify that a human has completed a form and not a bot, we need the following:

1. A graphic only a human can read/understand.
2. A web form for the human to re-enter the contents of the accompanying graphic.
3. A tracking code for the receiving web page to verify the submitted form.
4. A unique key only the server knows (for security purposes).

In the first segment of code, a five-digit CAPTCHA is generated by taking a random number between 0 and 56,635 and turning this into a 32-character hash using the md5() function. Then a random substring of five digits is taken from the hash string.

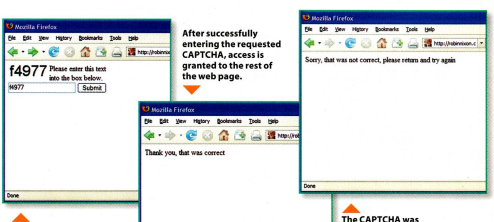
A hash consists of hexadecimal characters, so our five-digit string will contain any of the letters from a to z and the numbers zero to nine. Using this procedure returns a character string that is unique to one in 1.8 million.

Then the GD library is called upon to create a GIF image containing this string. For the sake of simplicity, in this tutorial all we're doing is copying a font called font.ttf to the same directory on the server as the code, and then creating a black and white GIF using it.

This system will foil many bots, but not those with good optical character recognition (OCR). So, once you have the code working, you will probably want to use a variety of fonts and colours. You may also decide to overlay your CAPTCHAs on a textured background and possibly draw a few random lines and/or shapes too.

But for now, we'll just create the basic GIF and then save it to the server using a temporary five-digit file name (created using the same random string procedure as for the CAPTCHA string). This is so that the GIF can then be displayed by the same code segment in an IMG SRC statement. Note that we use a different random string for the file name, as using the CAPTCHA string would be a dead giveaway to even the dimmest hacker.

And the reason for using a random character string here is to ensure that no CAPTCHA images will be cached by the viewing browser. But don't worry, your server won't fill up with trash, as segment two of this tutorial's code will remove CAPTCHA GIFs that are no longer needed.




## MAKING A HASH OF IT

So, what's the reason for using hashes, anyway? The idea is that a hash is a one-way function. Once generated it's virtually impossible to recreate the input used. This means we can pass the hash, along with the user's input, to the second code segment for verification.

Well, almost. Because the second part of this code is standalone, if we simply pass the hash and the input to it, it would be an easy matter for a hacker to generate a five-digit CAPTCHA, work out the hash and then inject them into the code.

So, here's where our unique key comes in. Before creating the check code to be posted from the web form, this key (which is called SecretWord in the example) is pre-pended to the CAPTCHA, and only then is the hash generated.

This means we can quite clearly and openly include the check code on our web pages as it's of no use at all to a hacker who doesn't know our secret key. Hackers have no ability to create a five-digit CAPTCHA (and from that to generate the required check code we're looking for).

The beauty of this system is that no session key needs to be set up, and the receiving segment of code for your web form needs to know nothing other than your secret key in order to be able to verify a CAPTCHA.

## IN FINE FORM

Towards the end of the first segment you'll see the simple web form that is output as HTML. In it the values of the check string and the .gif file name are openly viewable (using View > Source) but are hidden from surfers. All that is asked of the user is to enter the CAPTCHA as shown.

The form action points to a file in the example we have called next.php, but this could be any PHP-supported page you want to ensure only humans have access to. The page should contain the following code:

```
<?php
@unlink(stripslashes("$gifname. gif"));
if ($check != md5("SecretWord$capt cha")) {
echo "Sorry, that was not correct, please return and try again";
exit;
}
?>
Thank you, that was correct
```

See how simple that code is? All it does is delete the GIF image (as it's no longer needed). The @ is used to suppress any error messages in case the page has been reloaded and the image is already erased, while the stripslashes() function is called upon to ensure hackers don't try to inject / characters and mess with your server.

Having done that little bit of housekeeping, we do a quick concatenation of our secret key to the received input and convert the result to a hash. If that hash does not exactly match the check code (also posted to this segment) then the CAPTCHA has failed this time round and the user (or bot!) is asked to try again.

Otherwise, the PHP code is exited and we are on to straight HTML, where you place the rest of the page you wanted to ensure only humans could access.

## DO THIS... MAKE YOUR CAPTCHAS HARDER TO CRACK

**There are numerous commands available in the GD Graphics Library. You can see the complete set at *www.php.net/gd*, where you'll find plenty of functions you can enhance this program with, such as creating borders, adding shapes or fills, embossing, smoothing and a whole lot more. Every feature used will make your CAPTCHAs harder for those pesky bots to crack. But we'd recommend you also do a lot of usability testing, to ensure you aren't making them too difficult for humans to read.**




**The GD Graphics Library is available on most platforms and works with a range of programming languages to provide sophisticated graphical support.**

# downtime

HIGH PERFORMANCE PLAYTIME






## The Family Guy Blue Harvest

One of the greatest movies in Geekdom has been lovingly spoofed in this highly impressive short feature from the makers of *The Family Guy*. Every plot hole, inconsistency and in-joke has been utilised to hilarious effect. An obese Han Solo and pint-sized Darth Vader both steal the show as the abridged *Star Wars* story is played out. The 3D animation captures the look of the film in such detail that you'd almost swear that you were watching scenes from the original. As they say 'the force is strong in this one'. Freakin' sweet!

CONTACT Twentieth Century Fox
ONLINE www.foxmovies.com.au
PRICE $29.95
VERDICT ★★★★½

## Cellwatch M500 wrist phone

Fancy getting out there and joining the world of international espionage? Just like the ones in the spy movies, the M500 is being touted as the world's first wristwatch mobile phone. Now you can follow people in secrecy as you covertly send text messages and make sly phone calls. (Although *APC* doesn't condone stalking, no matter how much fun it might be). This slightly oversized watch is Bluetooth-enabled and doubles as an MP3 player. It delivers over three hours of talk time, can store 99 numbers and comes with 40 ring tones.

CONTACT Cellwatch
ONLINE www.mymobilewatch.com
PRICE $999.99
VERDICT ★★★½☆

## Nintendo Wii Zapper

Ever feel like shooting the TV? Yep, here at *APC*, we do too sometimes, which is why the new Zapper kit for the Nintendo Wii makes perfect sense. Essentially a plastic mould which snugly houses both the Wii Remote and Nunchuk controller, the Zapper adds an extra sense of realism to shooter titles. Lightweight and easy to use, it comes with a free demo game, Link's Crossbow Training, a mini Zelda game to help train you up on the new device. At less than fifty bucks, you can't go wrong. Bargain.

CONTACT Nintendo
ONLINE www.nintendo.com.au
PRICE $49.95
VERDICT ★★★★☆

## Media Carousel Plus

If Fonzie was around in the 21st century he would definitely have loved this. Looking more like a miniature jukebox than a CD storer, the Media Carousel Plus can hold and organise up to 150 discs from a variety of formats. Discs can be retrieved in two ways, using a keypad or by a USB connection and a searchable database on your computer. With additional USB ports, the Media Carousel can be stacked to create a library of storage for home or business. Just don't make like the Fonz and try to kick it.

CONTACT Ziotek
ONLINE www.ziotek.com
PRICE US$139
VERDICT ★★★½☆




## Panasonic SDR-SW20

The SDR-SW20 is a compact standard-definition camcorder that is built for those who love the outdoors. With its strengthened body based on the Toughbook series of notebooks, the dustproof, shockproof and waterproof SW20 is built to withstand everyday punishment. The controls have also been designed for ease of use in underwater situations. They're a lot of fun to use, so grab one and head for the beach… or the reef. Just make sure that you don't get carried away and duck-dive below the maximum depth of 1.5 metres. You may regret it.

CONTACT Panasonic
ONLINE www.panasonic.com.au
PRICE $799.95
VERDICT ★★★★☆

## Canon IXUS 80 IS

Canon has added a new digital compact to its popular range of IXUS cameras. Available in a range of stylish colours, the 8-megapixel 80 IS contains an Optic Image stabiliser, motion detection technology and noise reduction for clearer images in low light. Packed with other features such as face detection, 3x optical zoom and auto white balance, anyone can get good results with minimal effort. Easy-to-use controls and a huge 2.5in LCD display allow for easy and accurate image previewing, so you'll know straight away if you've got the shot or not.

CONTACT Canon
ONLINE www.canon.com.au
PRICE TBA
VERDICT ★★★½☆

## Drivemocion

This could either reduce the regularity of road range incidents, or add to them. Drivemocion is an illuminated car messaging sign that allows drivers to communicate with each other without resorting to the finger. There are 5 different pre-set messages that cover the basic road situations. Smileys and angry faces and a pleasant 'thank you' are the most benign choices. For those of us who want to get things off our chest, you can bring up the 'back off' message or call someone an 'idiot' at the touch of a button. Just make sure that they're not driving a car that is faster than yours.

CONTACT Drivemocion
ONLINE www.drivemocion.com.au
PRICE $59.95
VERDICT ★★★½☆

## Bang & Olufsen Beo5 universal remote

Essentially just a fancy (and expensive) universal remote, the Beo5 allows users to control a myriad of devices as long as they are connected through a B&O TV or sound system. It is even capable of commanding other remote controlled systems like automated lights and blinds. Its split design allows for the segmentation of controls. Common functions have dedicated tactile buttons on the aluminium ball that forms the lower half of Beo5. For everything else, the touch-sensitive LCD interface offers hundreds of choices and is easy to set up, with a little practice.

CONTACT Bang & Olufsen
ONLINE www.bang-olufsen.com
PRICE $795
VERDICT ★★★½☆



AVAILABLE PLATFORMS

PC-DVD | Wii | PS 3 | PS2 | XBOX 360 | PORTABLE DS

CONTACT Ubisoft
ONLINE www.assassinscreed.com
PRICE $119.95

✔ Graphics.

✖ Combat learning curve.

VERDICT ★★★★☆

# Assassin's Creed

RATING 1337

## *Troy Coleman* lives by the code.

With titles like Splinter Cell and the Prince of Persia series already in Ubisoft's stable, it's only natural that Assassin's Creed's (AC) chaff bag is filled with gold.

The year is 2012, and it is discovered that memories of our previous lives and experiences are stored within our DNA, and a machine called the Animus can extract them. Desmond Miles (you) has been kidnapped under the pretence of 'research', and it is soon learned that one of your previous lives was that of the assassin Altaïr. With the Animus, Desmond is forced to re-experience Altaïr's life and enters the Third Crusade of the Holy Land in the year 1191AD. Desmond's first memory is of Altaïr failing an assassination and being demoted to the lowest rank within the order, the Uninitiated. Given the chance to redeem himself by the leader of the Assassin's Guild, Altaïr is quested with nine assassinations throughout the 'Kingdom' (the four game regions consisting of Jerusalem, Acre, Damascus and Maysaf), which will herald an age of peace.



**Watch out for my hidden blade, it's a real killer.**

Graphically, AC is stunning: the land and cityscapes are richly detailed and beautifully lit. Historical research played a large role in the game's development, with some landmarks being represented faithfully. Essentially a stealth and evasion game, progress is an exercise in staying out of enemy line of sight, picking your battles and fleeing when overwhelmed.

The detailed streets bustle with activity and provide Altaïr with opportunities to glean information by eavesdropping, forcefully interrogating individuals, pick-pocketing or any other form of sneaky bastardry one can think of. Free running — think of games likes Crackdown — is a huge part of AC, with almost all buildings and surfaces scalable. Climbing spires, running from rooftop to rooftop then diving off the top of a cathedral, landing in a pile of hay unseen from the enemy is a hell of a lot of fun. Fists, hidden blade, long and short blades and throwing knives are the tools to see Altaïr through, with the hidden blade being the primary and, in most cases, the most-efficient means of assassination. To the game's detriment, combat can be a frustrating button-mash, with a steep learning curve — but, once mastered, AC is a fun-filled romp and a definite must-have.

# Resident Evil: The Umbrella Chronicles

## *Peter Dockrill* grabs his shotgun and fastens his seatbelt.

RATING 1337

When it was announced in 2006 that the new title in the Resident Evil series, The Umbrella Chronicles, would be a Wii exclusive *and* an on-rails shooter, scores of fans around the world were perplexed. Sure, the Wii might be able to take the famous zombie franchise places it hadn't been before, but was an on-rails shooter really the most logical destination?

This sense of doubt was only reinforced by last year's successful re-package for the Wii of Resident Evil 4, a game which had already been universally hailed as a high-point in the series. Combining 4's over-the-shoulder adventure perspective with the Wii's controls made a great game even better, so why take a backward step with Umbrella Chronicles?

Well, regardless of the reasoning, the results are a bit mixed, but UC still features the usual level of polish which RE titles exhibit. Unlike previous entries, the game doesn't introduce new plotlines or situations, but rather invites the player to revisit scenarios from previous RE titles, albeit from a new, rendered first-person perspective. You'll still need to conserve your precious ammo, but the emphasis is more focused on learning the key pickups, targets and strategies for getting through each section of the game, rather than exploring and puzzle-solving at your leisure. This leads to a lot of repetition and trial-and-error-based action, which isn't neccessarily the best way to enjoy the eerie environs on display. Still: the graphics and sound are top-notch; the ghouls are undeniably ghastly; Wii Zapper compatibility is a nice touch; and the challenge is certainly there.

AVAILABLE PLATFORMS

PC-DVD | Wii | PS 3 | PS2 | XBOX 360 | PORTABLE DS

CONTACT Nintendo
ONLINE www.nintendo.com.au
PRICE $89.95

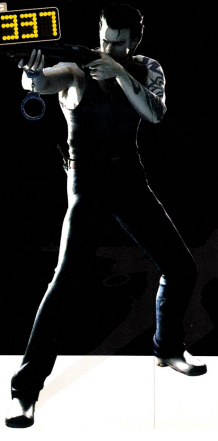
✔ Typical high-quality Resident Evil.

✖ On-rail limitations; lack of immersion.

VERDICT ★★★☆☆



**"Oh great, the ghouls are still ghastly."**



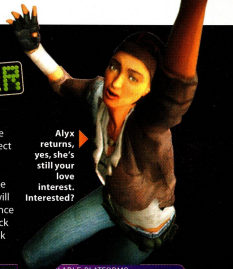
# Half-Life 2: Episode Two

## The saga continues for *Mike Channell.*

PURE UBER

The second of Valve's dalliances with episodic game distribution has arrived and it's nothing short of an absolute triumph. The idea behind the Half-Life 2 episodes is that rather than developing a full blown three-quel of 25 or so hours, Valve decided to continue the story as a trilogy of shorter adventures. While Episode One received a generally warm reception, it was criticised by some for failing to move the plot along enough and for being shorter than many expected. Fortunately, Episode Two (ET) addresses those problems and the end result is a masterclass in how to direct a linear first-person shooter. Arguably the most crucial factor is not the set pieces themselves, but their delivery. Valve is now the undisputed king of pacing, with ET quietly manipulating the player's level of interest and ensuring that you are never bombarded with enemies or left wandering aimlessly. Story developments are equally immaculate, including a dramatic and spectacular opening half hour and an even more remarkable finale. The supporting cast now consists of more three-dimensional characters, and your erstwhile companion and romantic interest, Alyx, plays a more important role. Praising the delivery and timing above all else is not to say the action is unimpressive — far from it. There's more variety than before and whether you're using the environment, stealth or a vehicle to level the odds against the Combine, it's always a gloriously orchestrated battle. The final confrontation is incredible, and plays out unlike any scene yet tackled by Half-Life.

Half-Life 2: Episode Two demonstrates how capable Valve has become at creating the perfect recipe for a focused and wholly enjoyable game. For the six or seven hours it takes to ramble the wilderness outside City 17, you will have played through an experience comparable in quality to BioShock but with no dead weight to speak of, high praise indeed.



**Alyx returns, yes, she's still your love interest. Interested?**



**Busy, busy, busy, there's no shortage of enemies to defeat.**

AVAILABLE PLATFORMS

PC-DVD | Wii | PS3 | PSP | XBOX 360 | NINTENDO DS

CONTACT Valve

ONLINE www.steampowered.com

PRICE US$29.95

✔ Compelling storytelling.

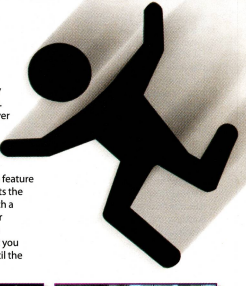
✖ N/A.

VERDICT ★★★★★

# Portal

## *Mike Channell* tests the new laws of physics.

Portal is a puzzle game played from the first-person perspective, with a core concept that is disarmingly simple and utterly inspired. Early in the game, you're given a gun that allows you to cast a portal on any compatible surface. If you then cast a second portal on another suitable material, you can pass through one portal and appear, with any momentum you've gathered intact, out of the other. The learning process in the game is accelerated by the impressive graphical representation of the portals. Better still, as you pass through, the transition is seamless. It's fantastically well-executed and means all you have to worry about are the puzzles, rather than the integrity of the game's physics. Brilliantly, Portal is more than a series of discrete challenges — there's a wonderful story to keep you pressing on. Your guide in the Aperture Science facility is an artificial intelligence known as GlaDOS, and her witty and expertly delivered lines of dialogue keep you grinning as you tackle increasingly lengthy and complex puzzles. The only criticism that can be levelled at Portal is that it's only in the final pair of test chambers that the puzzles are as substantial as the concept deserves. Until that time, there's a large degree of hand holding. It's by no means a deal breaker, though, and despite its constraints it remains a thoroughly enjoyable three to four hours of mental exercise. That experience is made even more satisfying by the excellent ending sequence, which is fittingly unique and utterly brilliant. So many games fail to deliver an ending worthy of their build up, so it's enormously pleasing to find that a puzzle game that few expected to feature a plot has an ending that fits the tone so perfectly and is such a worthwhile reward for your labours. In short, Portal is a pleasure from the moment you are thrust into its world until the final credits disappear.



AVAILABLE PLATFORMS

PC-DVD | Wii | PS3 | PSP | XBOX 360 | NINTENDO DS

CONTACT Valve

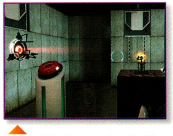
ONLINE www.steampowered.com

PRICE US$19.95

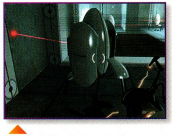
✔ Unique gameplay: fantastic story/dialogue.

✖ Wish it was longer.

VERDICT ★★★★☆



**Room with a view: or at least it will be once you open a portal into it.**



**Watch out for the turrets, they may sound cool, but they kill!**




# What in the world?

**If ever you needed proof that the internet has seen the means of cultural production shift from *them* to *us*, WikipediaVision (*www.lkozma.net/wpv/index.html*) may well be what you're looking for. Essentially an online real-time map of anonymous edits made to Wikipedia, WikipediaVision, which is still in beta, provides an eerie and fascinating glimpse into *what* people are writing about for the world's biggest encyclopaedia, *where* they're writing it from, and *when* they're writing it (usually three or four minutes ago; it's only "(almost) in real-time"). So, next time you're online clarifying those oft-misunderstood finer details in the history of early Hungarian cabinet-making, just remember: the world is watching.**



In space, anyone with an internet connection can hear you update Wikipedia...

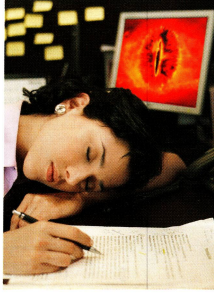
# Vii ARE NOT AMUSED

**The trophy halls of capitalism are decorated with the achievements of those who could do it, faster, cheaper and better than the other guy – and then there's the Vii, the kind of thing your uncle got you for Christmas when you were eight and you still have trouble looking him in the eye. Basically, it's a Chinese knock-off of the Wii console, complete with motion-sensing technology, jaw-droppingly-familiar appearance, plus Nintendo-flavoured TV and web advertising to round things off (*http://snipurl.com/1zi43* – wow, even those games are total doppelgangers). And all at a wallet-friendly 1,280-yuan pricepoint!**



# the abyss gazes also

"Uh, ahem! Er... excuse me, it's the, er, boss here. Um... it's time to get back to work... uh, please?"

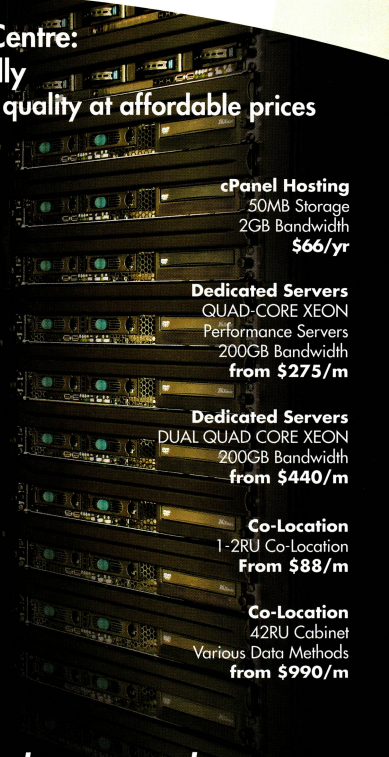


The psychology behind open-plan offices is that, because everyone can see what you're doing, you'll appropriately govern yourself and your work activities and, in turn, be a more effective employee. But, unfortunately, that's not enough for some people. *<<coff, Microsoft, coff>>* Nope, according to an article on *The Times Online* (**http://snipurl.com/1zi5q**), the software giant is seeking to patent 'spy' software, which, utilising wireless sensors, effectively turns your PC into a watchdog for the man, "capable of remotely monitoring a worker's productivity, physical wellbeing and competence". Imagine surfing YouTube at work, only to have your boss's face and wagging finger materialise on the screen in front of you, or performance reviews documenting just how often your pulse slows to a sleep-like rate. All of a sudden that private desk in the corner isn't quite the jewel it used to be. You have been warned. EDITH

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Rear View



Easy Assemble M/B Tray



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### S16V(VFD)

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**Superior Slim**



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### X11

**Professional Standard**



### X10

**Professional Slim**

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- VIA Luke CorePuslion™ Processor onboard with integrated UniChrome™ Pro AGP graphics w/MPEG2/MPEG4 Accelerator
- DDR 266/333/400 (SO-DIMM)
- 1 Mini-PCI slot
- VIA Vinyl 6 Channel Audio
- 6 USB 2.0 ports
- VIA 10/100 LAN
- VIA TV Out (HDTV)
- LVDS/DVI (optional)
- **Nano-ITX (120mm x 120mm)**
- Digital Media and Mobile Entertainment




**Model: EPIA-N**

- All in One
- VIA C7™/Eden™ Processor onboard with Integrated UniChrome™ Pro AGP graphics w/MPEG-2 acceleration
- DDRII 400/533
- 1 PCI slot
- Vinyl 6 channel Audio
- IEEE 1394 Firewire
- 6 USB 2.0 ports
- 2 COM ports
- GLAN Controller
- TV Out (HDTV)
- LVDS/DVI (optional)
- **Mini-ITX (170mm x 170mm)**
- Digital Media, Entertainment, Set Top Box



**Model: EPIA - EN**

## Powerful and Flexible Digital Media

- All in One
- VIA C7™ Processor onboard with Integrated UniChrome™ Pro AGP graphics w/MPEG-2 acceleration
- DDRII 400/533
- 1 PCI slot
- Vinyl 6 channel Audio
- 8 USB 2.0 ports
- 1 COM port
- 10/100M LAN
- TV Out
- **Mini-ITX (170mm x 170mm)**
- KIOSK, Thin Client




**Model: EPIA - CN**

- All in One
- VIA C3™/Eden™ Processor onboard with Integrated UniChrome AGP graphics w/MPEG-2 Acceleraton
- DDR 266
- CardBus/CompactFlash Support
- 1 PCI slot, 1 Floppy Connector
- Vinyl 6 channel Audio
- IEEE 1394 Firewire
- 4 USB 2.0 ports
- 2 COM ports
- VIA 10/100 LAN
- TV Out
- LVDS/DVI (optional)
- **Mini-ITX (170mm x 170mm)**
- Wireless Media,Kiosk,Set Top Box



**Model: EPIA - MII**

## Hard Working Small&Quiet Systems

- All in One
- VIA Luke CoreFusion Processor with Integrated UniChrome Pro AGP Graphics with MPEG-2/MPEG-4 Acceleration
- DDR 400 DIMM
- 1 PCI slot
- 2 SATA ports
- VIA Vinyl 6 Channel Audio
- IEEE-1394b
- 4 COM ports
- 2 VIA 10/100 Ethernet (1 optional Gigabit)
- 1 Digital I/O 4GPI/4GPO
- LVDS/DVI (optional)
- **Mini-ITX Form Factor (170mmx170mm)**
- Always-on Point of Sales Applications



**Model: EPIA - EK**

## Digital Media and Entertainment

- All in One
- VIA C3™/Eden™ with Processor onboard Integrated Unichrome AGP graphics w/MPEG-2 Acceleraton
- DDR 266
- 1 PCI slot, 1 Floppy Connector
- Vinyl 6 channel Audio
- IEEE-1394 Firewire
- 4 USB 2.0 ports
- VIA 10/100 LAN
- TV Out
- LVDS/DVI (optional)
- **Mini-ITX (170mm x 170mm)**
- Digital Media and Entertainment



**Model: EPIA - M**

## 19" Mini-ITX Rackmount

**Model No.:7677**

- 19" 1U Rackmount
- Internal 3.5"HDD x 1
- PCI Expansion Slot x 1
- Slim Type CD / DVD x 1
- 45(H) x 484(W) x 400(D)
- Cooling: 2 x 40mm fans
- Power and HDD indicators
- **Mini-ITX (170mm x 170mm)**
- Power on/off




## Firewall/VPN/Telephony/Telecom/VoIP Network/Security/Millitary Application

**Model No.: C1B**

- 19" 1U Rackmount
- Internal 3.5" HDD x 1
- Internal 2.5" HDD x 1
- PCI Expansion Slot x 1
- Slim CD-rom/DVD-rom x 1
- **19"(W) x 13"(D) x 1.75"(H)**
- **Mini-ITX(170mm x 170mm)**
- Cooling: 2 x 40x28mm fans
- Power on/off and system reset
- Power, LAN and HDD indicators



## Firewall/VPN/Telephony/Telecom/VoIP Network/Security/Millitary Application

**Model No.: C1E**

- 19" 1U Rackmount
- Internal 3.5" HDD x 2
- PCI Expansion Slot x 1
- Slim CD-rom/DVD-rom x 1
- 19"(W) x 14.9"(D) x 1.75"(H)
- Front access USB & LAN ports
- Power: LAN and HDD indicators
- **Up to 12" x 9.6" ATX size mobo**
- Power on/off and system reset
- Cooling: 1 x 97mm blower or 2 x 40x56mm fans



## World's Smallest Case

**Model No.: 1677**

- Color: Black
- Front Port: USB x 2
- Internal 2.5 HDD x 1
- Slim Type CD / DVD x 1
- 60W/80W Power Adaptor
- **Nano-ITX (120mm x120mm)**
- Power on/off and system reset
- **82.6mm(H) x 160mm(W) x 163mm(D)**



## Home Media Center, Set Top Box, Kiosk, Wireless Media

**Model No.: 2677**

- Color: Black
- Expansion Slot x 1
- Internal 3.5" HDD x 1
- 4cm Cooling Fan x 2
- Slim Type CD / DVD x 1
- 60W/80W Power Adaptor
- **Mini ITX (170mm x170mm)**
- Power on/off and system reset
- **63.5mm(H) x 295mm(W) x 272mm(D)**



## Home Media Center, Set Top Box, Kiosk, Wireless Media

**Model No.: 2600**

- Color: Black
- Expansion Slot x 1
- Internal 3.5" HDD x 1
- 4cm Cooling Fan x 2
- Slim Type CD / DVD x 1
- **63.5(H) x 295(W) x 272(D)**
- **Mini ITX (170mm x170mm)**
- 60W/80W Power Adaptor
- Power on/off and System Reset
- USB x 2, Audio x 1, Mic x 1, 1394 x 1, IR Module (Optional)



## Set Top Box, Thin Client, Car Entertainment, Smart Mini PC

**Model No.: 3677**

- Front Port: USB x 2
- Internal 2.5" HDD x 1
- 6cm Cooling Fan x 1
- Slim Type CD / DVD x 1
- 60W/80W Power Adaptor
- **Mini ITX (170mm x170mm)**
- Power on/off and system reset
- **65mm(H) x 210mm(W) x 275mm(D)**



## Set Top Box, Thin Client, Car Entertainment, Smart Mini PC

**Model No.: 3688**

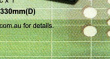
- Front Port: USB x 2
- Internal 2.5" HDD x 1
- 6cm Cooling Fan x 1
- Slim Type CD / DVD x 1
- 60W/80W Power Adaptor
- **Mini ITX (170mm x170mm)**
- Power on/off and system reset
- **65mm(H) x 210mm(W) x 258mm(D)**



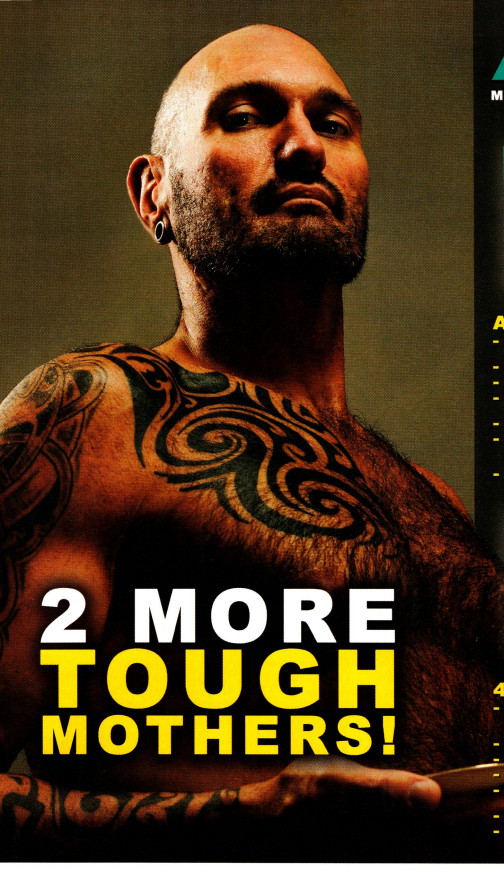
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**Model No.: 669**

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- Internal 3.5" HDD x 1
- 4cm Cooling Fan x 2
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- 200W ATX Power Supply
- **Mini-ITX (170mm x 170mm)**
- USB2.0 x 2, 1394/Audio/Mic x 1
- **200mm(H) x 225mm(W) x 330mm(D)**




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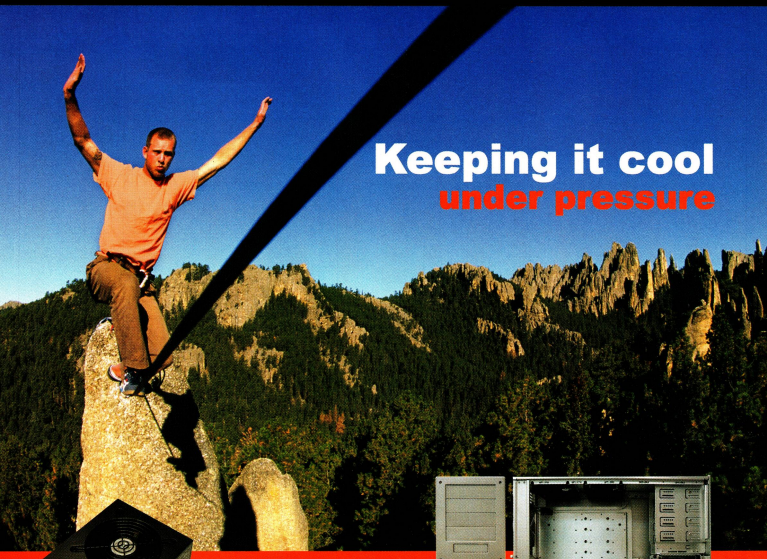
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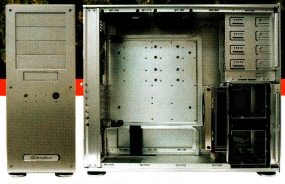
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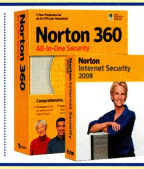
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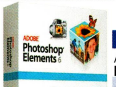
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| Model | TONNY |
|---|---|
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| BCI-24C | $7.20 |

| Model | TONNY |
|---|---|
| BX-3 | $28.00 |
| BC-02 | $28.00 |
| BC-03 | $28.00 |
| BC-05 | $30.00 |
| BC-20 | $28.00 |
| BCI-3eBK | $8.80 |

| Model | TONNY |
|---|---|
| BCI-3eC/M/Y | $6.40 |
| BCI-6BK | $6.40 |
| BCI-6C/M/Y | $6.40 |
| BCI-6G | $6.40 |
| BCI-6R | $6.40 |
| BCI-6PC/PM | $6.40 |

| Model | TONNY |
|---|---|
| BCI-15BK | $6.40 |
| BCI-15C | $7.20 |
| BCI-16C | $7.20 |
| BCI-21BK | $4.90 |
| BCI-21C | $6.40 |

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| Model | Genuine | TONNY |
|---|---|---|
| PGI-5BK | $22.50 | $8.50 |
| CLI-BBK | $22.50 | $8.50 |
| CLI-8C/M/Y | $22.50 | $8.50 |
| CLI-8PC | $22.50 | $8.50 |
| CLI-8PM | $22.50 | $8.50 |

## Samsung Ink Cartridges

| Model | TONNY |
|---|---|
| M40 | $23.00 |

## Epson Ink Cartridges

| Model | TONNY |
|---|---|
| T001 | $18.90 |
| T003 | $ 9.90 |
| T005 | $18.00 |
| T007 | $ 9.30 |
| T008 | $13.00 |
| T009 | $15.00 |
| T013 | $ 4.50 |
| T014 | $ 7.90 |
| T017 | $ 9.70 |
| T018 | $10.60 |
| T026 | $ 9.70 |
| T027 | $12.40 |
| T028 | $ 9.70 |
| T029 | $10.60 |
| T038 | $ 9.60 |

| Model | TONNY |
|---|---|
| T039 | $10.60 |
| T0321 | $10.80 |
| T0322 | $ 7.50 |
| T0323 | $ 7.50 |
| T0324 | $ 7.50 |
| T0422C/M/Y | $ 9.50 |
| T0461 | $ 8.90 |
| T0472/3/4 | $ 8.90 |
| T0491/2/3 | $ 8.90 |
| T0494/5/6 | $ 8.90 |
| T0540/1/2 | $ 8.90 |
| T0541/2/3/4 | $ 8.90 |
| T0547/8/9 | $ 8.90 |
| T0561/2/3/4 | $ 8.90 |
| T5591/2/3 | $ 8.90 |

| Model | TONNY |
|---|---|
| T5594/5/6 | $8.90 |
| T0621 | $8.90 |
| T0631/2/3/4 | $7.50 |
| T0731/2/3/4 | $9.50 |
| T0811/2/3 | $9.50 |
| T0814/5/6 | $9.50 |
| S020089 | $9.90 |
| S020093 | $5.10 |
| S020097 | $9.00 |
| S020108 | $6.50 |
| S020110 | $9.50 |
| S020187 | $5.10 |
| S020189 | $6.50 |
| S020191 | $9.00 |
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## HP Ink Cartridges

| Model | TONNY |
|---|---|
| 51625A | (#25) $28.00 |
| 51626A | (#26) $28.00 |
| 51629A | (#29) $28.00 |
| 51633MA | (#33) $32.00 |
| 51645A | (#45) $16.00 |
| 51649A | (#49) $28.00 |
| C1823D | (#23) $30.00 |
| C4841/2/3/4AA | (#10) $14.00 |
| C4836/7/8A | (#11) $14.00 |
| C5010DA | (#14) $26.00 |
| C5011DA | (#14) $24.00 |
| C6578D | (#78) $30.00 |
| C6614A | (#20) $24.00 |
| C6615DA | (#15) $24.00 |

| Model | TONNY |
|---|---|
| C6625A | (#17) $30.00 |
| C6656AA | (#56) $18.00 |
| C6657AA | (#57) $32.00 |
| C8658AA | (#58) $26.00 |
| C8727A | (#27) $24.00 |
| C8728AA | (#28) $26.00 |
| C8765WA | (#94) $27.00 |
| C8767WA | (#96) $29.00 |
| C9363WA | (#97) $32.00 |
| C8721WA | (#02) $11.00 |
| C8771/2/3WA | (#02) $10.00 |
| C8774/5WA | (#02) $10.00 |
| C9351AA | (#21) $21.00 |
| C9352AA | (#22) $23.00 |

## Brother Ink Cartridges

| Model | TONNY |
|---|---|
| LC-21BK | $7.90 |
| LC-21C/M/Y | $7.50 |
| LC-02BK | $7.90 |
| LC-02C/M/Y | $7.50 |
| LC-04BK | $7.90 |
| LC-04C/M/Y | $7.50 |
| LC-47BK | $7.90 |
| LC-47C/M/Y | $7.50 |
| LC-57BK | $6.90 |
| LC-57C/M/Y | $6.50 |
| LC-800BK | $7.90 |
| LC-800C/M/Y | $7.50 |

## Lexmark Ink Cartridges

| Model | TONNY |
|---|---|
| 12A1970 | $32.00 |
| 12A1980 | $35.00 |
| 17900050 | $32.00 |
| 17G0060 | $35.00 |
| 13400HC | $36.00 |
| 13619HC | $38.00 |

| Model | TONNY |
|---|---|
| 10N0016 (#16) | $36.00 |
| 10N0026 (#26) | $39.00 |
| 15M0120 (#20) | $41.00 |
| 18D0031 (#31) | $35.00 |
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| 18D0035 (#35) | $37.00 |

| Model | TONNY |
|---|---|
| 18L0032 (#82) | $39.00 |
| 18L0042 (#83) | $41.00 |

## Brother Toner Cartridges

| Model | TONNY |
|---|---|
| TN-100 | $23.00 |
| TN-200 | $23.00 |
| TN-2025 | $59.00 |
| TN-300 | $23.00 |
| TN-3060 | $65.00 |
| TN-8000 | $23.00 |
| TN-6600 | $65.00 |
| TN-7600 | $65.00 |

## Epson Toner Cartridges

| Model | TONNY |
|---|---|
| EPL-5700 | $49.00 |
| EPL-5900 | $49.00 |
| EPL-6200 | $49.00 |

## Lexmark Toner Cartridges

| Model | TONNY |
|---|---|
| Optra E210 | $59.00 |
| Optra E310 | $69.00 |
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| X215 | $59.00 |

## HP Black Toner Cartridges

| Model | TONNY |
|---|---|
| 92298A | $ 65.00 |
| C3906A/F | $ 49.00 |
| C3903A | $ 59.00 |
| C3909A | $ 95.00 |
| C4092A | $ 49.00 |
| C4096A | $ 65.00 |
| C4127A | $ 65.00 |
| C4127X | $ 80.00 |
| C4129X | $ 95.00 |
| C4182X | $135.00 |
| C7115A | $ 49.00 |
| C7115X | $ 65.00 |

| Model | TONNY |
|---|---|
| C8061X | $ 85.00 |
| Q1338A | $ 95.00 |
| Q2612A | $ 59.00 |
| Q2613A | $ 59.00 |
| Q2613X | $ 69.00 |
| Q2610A | $ 75.00 |
| Q2624A | $ 59.00 |
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| Q5949X | $ 75.00 |
| Q6511A | $105.00 |

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| | C9701/2/3A (CYM) | $79.00 |
| HP LJ4600 | C9720A (BK) | $155.00 |
| | C9721/2/3A (CYM) | $185.00 |
| HP LJ4500, Canon LBP2460/2040 | C4191A (BK) | $59.00 |
| | C4192/3/4A (CMY) | $69.00 |
| HP LJ8000 | C4149A (BK) | $89.00 |
| | C4150/1/2A (CMY) | $155.00 |
| Epson C900/1900 | S050100 (BK) | $79.00 |
| | S050097/98/99 (CMY) | $119.00 |
| Epson C1000/C2000 | S050033 (BK) | $90.00 |
| | S050034/5/6(CMY) | $119.00 |

## Samsung Toner

| Model | TONNY |
|---|---|
| ML-1210D3 | $ 59.00 |
| ML 1650D8 | $105.00 |
| ML-1710D3 | $ 59.00 |
| ML-2010 | $ 59.00 |
| ML-2150D8 | $140.00 |
| ML-4100D3 | $ 83.00 |
| ML-4500D3 | $ 73.00 |
| ML-6060D6 | $ 93.00 |
| SCX-4216D3 | $ 59.00 |
| SCX-5312D6 | $ 79.00 |
| SCX-D4200A | $ 69.00 |
| SF-5100D3 | $ 59.00 |

## Canon Toner

| Model | TONNY |
|---|---|
| E-31 | $85.00 |
| EP-22 | $49.00 |
| EP-25 | $49.00 |
| EP-26 | $69.00 |
| EP-32 | $65.00 |
| EP-52 | $80.00 |
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2C....11
Acer....3, 6, 10
Acronis....47
ACTI....40
Adobe....36, 37, 38, 39, 40
Apple....4, 6, 7, 14, 36, 38, 44, 45
Autodesk....35
AV Labs....13, 15
Belkin....7, 8, 20
Billion....19
Blaze....38, 39
Brother....22, 23, 24, 25
Bullguard....47
Business Objects....43
Business Solutions....9
Canon....6, 12, 22
Cleansafe....7
Compaq....3, 4
Compro....31
Computer Associates....47
CoPilot....13
Corel....36, 38, 39
Cyber Acoustics....15
Cyberlink....38
D-Link....18, 19, 20, 24
Dvico....30, 31
Edifier....15
Epson....6, 11, 22
Evocept....18
Excel Media....27, 31
FileMaker....42, 43
Fuji Xerox....23, 24, 25
Fujitsu....3, 4, 5
Harmon Kardon....14
HP....6, 7, 8, 23, 24, 25, 26
HP Procurve....21
HTC....13
iHome....14
Imation....27
IMSI....35
IRISCard....28
JBL....14
Kaiser Baas....30, 31
Kodak....12, 22, 30
Konica Minolta....23, 24, 25
Konnet....11
LaCie....16, 17, 18, 31
Lenovo....6, 7, 34
LG....10
Linksys....18, 20, 30
Logitech....3, 4, 5, 14, 15, 28, 29, 30
Maxtor....17, 18
McAfee....47
Microsoft .5, 28, 29, 30, 40, 42, 44, 45, 47, 48
MYOB....33, 34
Nero....39
Net Nanny....47
Netcomm....19
Netgear....18, 19, 20, 24
Neuros....41
Nitro....40
Nokia....13
Nuance....41
Olympus....12
Palm....13
Panasonic....12
Parallels....44
PC Tools....47
Pinnacle....38
Punch!....36
Quark....36
Quickbooks....32, 34
Reallusion....39
Roxio....38, 39
Samsung....10, 12
Sandisk....12, 14, 16
Seagate....16, 17
Shuttle....6, 7
Sly'd....17
Sony....38
Spacedec....10
Symantec....46
Tango....17
Targus....3, 4, 5, 29
Toshiba....3, 5
Travroute....13
Trend Micro....47
Verbatim....16, 17, 27
Viewsonic....10, 11
Wacom....28
WD....3, 16, 17, 18
XP Sound....15
Zone Alarm....47



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| Melbourne (Vic): | Shop 3, 222 Latrobe Street, Tel: 03 9250 6900, Fax: 1300 658 010, Email: melbournecity@csw.com.au | |
| North Sydney (NSW): | Shop 7-8, 111 Pacific Hwy (Cnr Walker Street), Tel: 02 9455 5900, Fax: 02 9957 1854, Email: northsydney@csw.com.au | |
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Reap the rewards today!

## Fujitsu ESPRIMO MOBILE V5545

NEW



- Intel Core 2 Duo Processor T7500 2.2GHz
- 2GB DDR2 667MHz Memory
- **250GB 5400rpm Hard Drive**
- DVD SuperMulti Drive
- 128MB ATI Mobility HD2400 Graphics (HyperMemory 896MB)
- 15.4" WXGA 1280x800 LCD Screen
- Web Camera, BT, Gigabit LAN, 802.11b/g/n Wi-Fi
- **Windows Vista Business (XP Downgrade Included)**

**2 Year Pickup and Return Warranty**

**Made in Germany**

**BONUS** Carry Bag & Free Domestic Return Flight - Ends 12/03/2008

See www.csw.com.au/promotions

**$1887** SAVE $112 off RRP WebCode: FUJI0063

## Logitech V20 USB Notebook Speakers

Hit the road without missing your music. Enjoy rich stereo sound and deep bass even when you travel, thanks to this lightweight, portable design, active/pressure driver combination maximise bass response in a lightweight, portable design. Travel case included.



**$79** SAVE $31 off RRP WebCode: LOG3508

## Compaq Presario C731TU

- Intel Celeron 540 Processor 1.86GHz
- 512MB DDR2 667MHz Memory
- 80GB 5400rpm Hard Drive
- 15.4" WXGA 1280x800 LCD Screen
- Web Camera, 10/100 LAN, 802.11b/g/n Wi-Fi
- Intel GMA X3100 up to 64MB Graphics
- DVD SuperMulti Drive
- Windows Vista Home Basic

**1 Year Warranty**



**$796** SAVE $53 off RRP WebCode: COP0731

## Acer Extensa 5220 Bundle

- Intel Celeron M processor 1.86GHz
- 1GB DDR2 667MHz Memory
- 80GB Sata 5400rpm Hard Drive
- Intel GMA X3100 up to 384MB Graphics
- DVD Super Multi Drive
- 15.4" WXGA 1280x800 LCD
- Webcam, Gigabit Lan, 802.11 b/g Wi-Fi, 56K Modem
- Windows Vista Business & XP Downgrade Disc



**1 Year Warranty**

**BONUS** Norton Internet Security & Carry Bag

**$818** SAVE $171 off RRP WebCode: ACB0158

## WD Passport Portable (Black) 160GB USB 2.0 Hard Drive

High performance portable storage for your Mac and PC. Light and rugged, it's easy to carry and no external power adapter is needed. Comes with sync encryption and Google software. Pack up your office files and take them home. Carry thousands of songs or pictures.

**250GB USB 2.0** (WDD0092) $188
**320GB** (WDD0118) $268

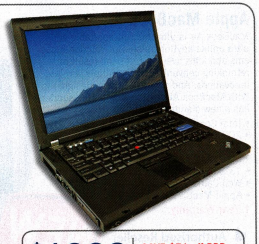


**$145** SAVE $5 off RRP WebCode: WDD0079

## Toshiba Satellite Pro A200

- Intel Core 2 Duo T81000 2.1GHz Processor
- 1GB DDR2 667MHz Memory
- 120GB SATA Hard Drive
- DVD SuperMulti Drive
- Intel X3100 Graphics
- 15.4" WXGA 1280x800 LCD Screen
- Gigabit Lan, 802.11 a/b/g Wi-Fi, Bluetooth
- Windows XP Pro

**1 Year Warranty**



**$1398** SAVE $51 off RRP WebCode: LEN0072

## Targus Urban Overnight Roller

This roller has a removable padded notebook slip case with handles and a shoulder strap for mobility, designed to fit notebooks with up to 15.4" screens. The spacious inner compartments can easily accommodate clothing, computer accessories and files. With a telescopic locking handle, recessed in-line skates and an extra handle on the side, this case is an ideal travel companion.



**$144** SAVE $55 off RRP WebCode: TAR6001

## Targus Atmosphere Case & Stereo Travel Speakers

- Quick access top loading case suits up to 15.4" widescreen Notebooks
- High-density padded notebook compartment for maximum protection of your notebook

**Stereo Travel Speakers.**

- Enhances sound quality of notebook and MP3 players




$45 | SAVE $54 off RRP | WebCode: TAR0009

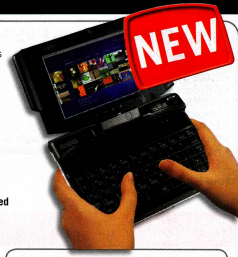
## Fujitsu LifeBook U1010U

Digital experiences come together perfectly with the world's smallest tablet convertible ultra-mobile PC created by Fujitsu, the LifeBook U1010. Versatile and stylishly designed, it is equipped with the latest Intel Ultra Mobile platform for uncompromising performance, anywhere you go.

- Intel A110 800MHz
- 1GB DDR2 667MHz Memory
- 40GB 4200rpm Hard Drive
- Intel Graphics with 3D accelerator
- Web Camera, BT, Super G Wi-Fi
- Biometric Fingerprint Scanner
- 5.6" WSVGA 1024x600 Passive Touch Screen
- **Windows Vista Business Windows XP downgrade included**
- **Embedded 3.5G UMTS/HSDPA (Next G compatible)**
- **0.63kg weight**

**Made in Japan**

**2 Year Pickup and Return Warranty**




$1812 | SAVE $187 off RRP | WebCode: FUJ0064

## Logitech QuickCam Pro for Notebooks

The ultra-compact Logitech QuickCam Pro for Notebooks uses Carl Zeiss optics with autofocus to deliver 8-megapixel, razor sharp photos-even in extreme close-ups. RightLight 2 intelligently adjusts to produce the best possible image.

**Travel case and desktop stand included**



$139 | SAVE $40 off RRP | WebCode: LOG3631

## Compaq Presario V742TU

- Intel Pentium Dual Core Processor T2330 1.6GHz
- 1GB DDR2 667MHz Memory
- 120GB 5400rpm Hard Drive
- 15.4-inch WXGA 1280x800 LCD Screen
- Web Camera, 10/100 LAN, 802.11b/g/n Wi-Fi
- DVD SuperMulti Drive
- Intel GMA X3100 up to 64MB
- Windows Vista Home Premium

**1 Year Warranty**




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$903 | SAVE $46 off RRP | WebCode: COP0742

## Compaq Presario V6708TU

- Intel Core 2 Duo Processor T5450 1.67GHz
- 1GB DDR2 667MHz Memory
- 160GB 5400rpm Hard Drive
- Intel GMA X3100 up to 64MB
- 15.4" WXGA 1280x800 LCD Screen
- DVD SuperMulti Drive
- Web Camera, BT, Gigabit LAN, 802.11b/g/n Wi-Fi
- Windows Vista Home Premium

**1 Year Warranty**




$1162 | SAVE $137 off RRP | WebCode: COP6708

## Targus 100W Auto Power Inverter

Providing a power source for most electrical devices in RVs, cars or boats, this inverter is designed to conveniently fit into most standard cup holders. Simply plug the inverter into the cigarette lighter plug and power or charge up to three devices including notebooks, mobile phones, PDAs and many others.




$73 | SAVE $26 off RRP | WebCode: TAR5082

## Apple MacBook Air

MacBook Air is ultrathin, ultraportable and ultra unlike anything else. But you don't lose cms and kilos overnight. It's the result of rethinking conventions. Of multiple wireless innovations. And of breakthrough design. With MacBook Air, mobile computing suddenly has a new standard.

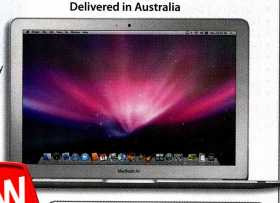
- Intel Core 2 Duo Processor 1.66GHz
- 2GB DDR2 667MHz Memory
- 80GB 4200rpm Hard Drive
- Intel GMA X3100
- 13.3" WXGA 1280x800 LCD Screen
- Web Camera, BT, 802.11a/b/g/n Wi-Fi
- Apple MacOS X 10.5

**1 Year Warranty**

Authorised Reseller

‡See citysoftware.com.au/promotions

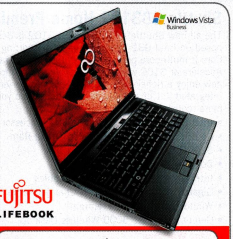
**‡Guaranteed Best Price**
**Delivered in Australia**




$2421 | SAVE $78 off RRP | WebCode: APP0360

## Fujitsu LifeBook S6510U

- Intel Core 2 Duo Processor T7500 2.2GHz
- 2GB DDR2 667MHz Memory
- 160GB 5400rpm Hard Drive
- DVD SuperMulti Drive
- Intel Graphics Media Accelerator X3100
- 14.1" WXGA LED Backlight Screen in 13.3" Chassis
- Gigabit Lan, 802.11 a/g/n Wi-Fi, 56K Modem
- Windows Vista Business (XP Downgrade Included)
- 2yrs Pickup and Return Warranty
- Made in Japan
- Embedded 3.5G UMTS/HSDPA (Next G compatible)
- Spill resistant keyboard
- Biometric Fingerprint Scanner
- 1.66kg weight




**BONUS** Fujitsu Port Replicator, Carry Bag and USB Mouse

**$2867** SAVE $232 off RRP
WebCode: FUJU065

## Targus Notebook Cooling Chill Mat

Two fans help maximise notebook performance and help prevent overheating by providing cool air to the notebook. Four rubber feet keep the notebook in place, while the Chill Mat protects your lap or workspace surface from heat generated by notebooks. It plugs directly into your notebook's USB port, so an AC adaptor is not required.




**$38** SAVE $11 off RRP
WebCode: TAR5065

## Toshiba Satellite Pro M200

- Intel Core 2 Duo Processor T5450 1.6GHz
- 1GBB DDR2 667MHz Memory
- Intel Graphics Media Accelerator GM965
- 80GB 5400rpm Hard Drive
- DVD SuperMulti Drive
- 14.1 Widescreen XGA 1280x800 Screen
- 10/100 LAN, 802.11 a/b/g Wi-Fi, BigPond Wireless Broadband Mobile Card
- Windows Vista Business




**1 Year Warranty**
**TOSHIBA**

**$1485** SAVE $645 off RRP
WebCode: TOS15210

## Acer TravelMate 7720G Bundle

- Intel Core 2 Duo Processor T7500 2.2GHz
- 2GB DDR2 667MHz Memory
- 2 x 250GB 5400rpm Hard Drive
- DVD SuperMulti Drive
- ATI Redeon HD 2600 XT 512MB Graphics
- 17" WSXGA 1440x900 LCD Screen
- Web Camera, BT, Gigabit LAN, 802.11b/g/n Wi-Fi
- Windows Vista Business (XP Downgrade Included)



**3 Year Warranty**

**BONUS** Belkin Executive Bag & Norton Internet Security

**$2247** SAVE $401 off RRP
WebCode: ACB0148

## Logitech Premium 4 Port USB Hub for Notebooks

Increase your possibilities with a compact 4 port USB hub that fits your mobile lifestyle. Extra ports add instant connectivity for up to four devices - including thumb drives, cameras, and MP3 music players.




**$30** SAVE $19 off RRP
WebCode: LOG3644

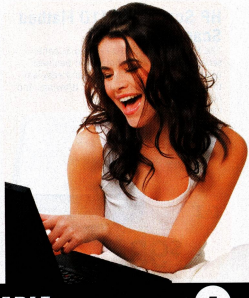
## Make any of these Notebooks a Windows Vista Ultimate Notebook for only $199

Experience the features Windows Vista Ultimate has to offer when upgrading from Windows Vista Business. Now you can:

- Experience Photos and Entertainment
- Enjoy Windows Media Center
- Better Protect your data
- Easily made DVDs
- Create high definition movies
- Have more fun on your Notebook




Webcode MSA5112



## Canon CanoScan 8800F Scanner

**The easy to use, high speed scanner with versatile features.**

High-resolution scanning up to 4800x9600dpi, 48 bit input/output resolution FARE Level 3, the optimal solution for film scanning. Automatic dust & scratch, fading, graininess and backlight correction technology



Canon

**$317** SAVE $32 off RRP
WebCode: CAN0680

## Shuttle SG31G2 Home Premium SFF

The all new Shuttle XPC Glamor SG31G2 is designed based on Intel G31 Express Chipset supporting Intel Core 2 multi-core processors. Featuring the Graphics Media Accelerator 3100 with Intel Clear Video Technology you can now enjoy a richer high-quality viewing experience and with integrated 7.1 channel high definition audio you can enjoy more realistic audio.

- Intel Core 2 Duo E6750 2.66 GHz Processor
- Corsair 2GB PC-5300 667MHz DDR2 Ram
- 320GB SATA II 7200rpm Hard Disk
- Double Layer 20x DVD+RW Drive
- Intel GMA 3100 DirectX 9.0 Graphics
- Gigabit Ethernet, Firewire, 8 Channel Audio
- Windows Vista Home Premium
- Genius LuxeMate 3000 Wireless Desktop

**1 Year Warranty**




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Shuttle

**$1048** SAVE $251 off RRP
WebCode: SHU0009

## Epson Perfection V200 Photo Scanner

The Epson Perfection V200 Photo is a versatile scanner suitable for a wide range of applications including scanning photos, documents, thick objects and 35mm strip film and slide scanning. Featuring Epson's superior Matrix CCD Micro Lens, 4800 x 9600 optical dpi and fast scanning speeds of as little as 16 seconds.



EPSON

**$230** SAVE $19 off RRP
WebCode: EPS0200

## Acer Veriton L460 Ultra Small Form Factor

- Intel Pentium Dual Core E2160 1.8GHz Processor
- 1GB DDR2 Ram
- 160GB SATA Hard Disk
- DVD-RW Dual Layer Drive
- Intel GMA 3100 Graphics
- Gigabit Ethernet, 4 x USB, 6 Channel Audio
- Windows Vista Home Premium

**3 Year Warranty**



acer

**$796** SAVE $63 off RRP
WebCode: ACD1377

## HP DX2300 Mini Tower

- Intel Pentium Dual Core E2140 1.6GHz Processor
- 512MB DDR2 Ram
- 80GB SATA 7200rpm Hard Disk
- DVD-RW Dual Layer Drive
- Intel GMA 3000 Graphics
- 10/100 Ethernet, 6 x USB, 6 Channel Audio
- Windows XP Pro

**1 Year Warranty**

Monitor not Included



**$778** SAVE $210 off RRP
WebCode: HCP5998

## HP Scanjet G2410 Flatbed Scanner

The HP Scanjet G2410 Flatbed Scanner series is designed for home and business users who want an affordable and easy way to convert documents, photos, drawings and other images into digital files for easy sharing, reprinting and storing.

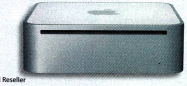


**$93** SAVE $6 off RRP
WebCode: HPS2110

## Apple Mac Mini Desktop

- Intel Core 2 Duo 2GHz Processor
- 1GB DDR2 667Mhz Ram
- Intel GMA950 Graphics
- 120GB 5400rpm SATA Hard Drive
- Slot-loading SuperDrive
- Mac OS X Leopard

**1 Year Warranty**



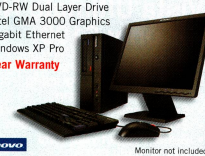
Authorised Reseller

**$1117** SAVE $31 off RRP
WebCode: APP0312

## Lenovo M55 Small Form Factor

- Intel Pentium Dual Core E2140 1.6GHz Processor
- 1GB PC2-5300 DDR2 SDRAM Ram
- 80GB SATA 7200rpm Hard Disk
- DVD-RW Dual Layer Drive
- Intel GMA 3000 Graphics
- Gigabit Ethernet
- Windows XP Pro

**3 Year Warranty**



Monitor not included

lenovo

**$1027** SAVE $231 off RRP
WebCode: LDB0125

## HP DX7400 SFF Desktop 20" LCD Bundle

- Intel Core 2 Duo E6550 2.33GHz Processor
- 1GB 667MHz DDR2 RAM
- 160GB 7200rpm SATA Hard Drive
- LightScribe DVD Burner
- Intel Graphics Media Accelerator 3100
- Gigabit Ethernet, 8 x USB
- Windows Vista Business

**1 Year Warranty**




**BONUS**
HP Photosmart C4385 All in One

**$1653** SAVE $425 off RRP
WebCode: HCP6242

## Belkin F3U150 - USB 2.0 File Transfer Cable

The Belkin USB 2.0 File Transfer Cable provides the perfect solution that allows you to copy files from PC to PC without the need to install drivers when used with Windows ME, 2000 or XP. Fantasic for the mobile user to transfer files to and from your laptop without the need of a complicated network setup. Designed with the computer novice in mind, it couldn't be easier!




BELKIN.

**$65** SAVE $34 off RRP
WebCode: BEL1150

## Shuttle SG33G5 Professional SFF

- Intel Core 2 Quad Q6600 2.40 GHz Processor
- Corsair 2GB PC-6400 800MHz DDR2 RAM
- 500GB SATA II 7200rpm Hard Disk
- Double Layer 20x DVD+RW Drive
- Intel GMA 3100 DirectX 9.0 Graphics
- Gigabit Ethernet, 6 x USB, HDMI, Firewire, 8
- Channel Audio, 2 x eSATA
- Windows Vista Business
- Genius LuxeMate 600 Wireless Desktop

**1 Year Warranty**



**$1357** SAVE $272 off RRP
WebCode: SHU0008

## Lenovo ThinkCentre M57 19" LCD Bundle

- Intel Core 2 Duo E6550 2.33GHz Processor
- 1GB 667MHz DDR2 RAM
- 80GB 7200rpm SATA Hard Drive
- DVD-ROM
- Intel Graphics Media Accelerator 3100
- Gigabit Ethernet, 6 x USB, 1 x eSata
- Windows XP

**3 Year Onsite Warranty**



**$1648** SAVE $95 off RRP
WebCode: LDB0087

## Cleansafe TFT Screen Clean

For use on all coated and non-coated laptop, notebook, TFT, plasma, LCD, PDA, GPS, mobile, basically any screen or monitor. Extensively tested by users and manufacturers, laboratory and industry tests have shown that Cleansafe will clean and protect all screen surfaces.




**$22** SAVE $4 off RRP
WebCode: CLE0001

## Apple iMac 20" Desktop

**The all new, all-in-one iMac**

Setting new standards for elegance and simplicity, the all-new, all-in-one iMac packs all its components from processor to video camera into an astoundingly thin, anodised aluminium frame.

- 2.0GHz Intel Core 2 Duo processor
- 250GB Serial ATA 7200-rpm hard drive
- Slot-loading 8x SuperDrive (DVD±R DL/DVD±RW/CD-RW)
- 20-inch glossy widescreen TFT (1680 by 1050 pixels)
- Built-in AirPort Extreme wireless networking
- ATI Radeon HD 2400 XT graphics processor with 256MB GDDR3 memory

**20" 2.4GHz** (APP0318) **$2076**
**24" 2.4GHz** (APP0319) **$2487**

Authorised Reseller



**$1642** SAVE $56 off RRP
WebCode: APP0317



## Belkin Snagless Ethernet Patch Cables - Blue

The RJ45 Moulded Cat 5e Patch Cable is perfect for use with 10/100 Base-T networks. Complete with RJ45 male-to-male connectors and Snagless moulded strain relief.

| | | |
|---|---|---|
| **1m** | (BEL8009) | **$6** |
| **2m** | (BEL8016) | **$10** |
| **3m** | (BEL8023) | **$12** |
| **5m** | (BEL8030) | **$16** |
| **10m** | (BEL8037) | **$22** |
| **15m** | (BEL8044) | **$32** |

Also available in Green, Red, White, Yellow & Black



BELKIN

## Belkin 1200VA UPS

The Belkin Universal Series UPS with AVR technology offers the most complete protection from damaging power disturbances to home or office workstations. Our complete power protection solution safeguards your valuable equipment and critical data from blackouts, brownouts, surges, spikes, and lightning. In a power outage or brownout, the Universal UPS automatically switches your computer to battery backup power and gives you the time to save open files and safely power off.



BELKIN

**$368** SAVE $131 off RRP
WebCode: BEL2250

## Belkin 16 Port Pro3 KVM Switch

The OmniView PRO3 USB & PS/2 KVM Switch provides easy and dependable server control with extraordinary performance. The Switch enables network administrators to monitor and control up to four, eight, or 16 USB- and PS/2-platform servers from a single console. The PRO Series KVM Switches are the industries most popular for small-to-medium server rooms, branch locations, and test and development labs.



BELKIN

**$758** SAVE $141 off RRP
WebCode: BEL9567

## HP ML 115 Server Bundle



| | | | |
|---|---|---|---|
| **Part Number** | 441054-015 | **Slot Totals** | 2x 32-bit/33MHz PCI, 2x PCI-Express slots |
| **Processor** | AMD Opteron Processor 1.8GHz | | |
| **Memory Ram** | 1GB DDR2 Memory | **Form Factor** | 4U Tower |
| **Hard Drive** | 2 x 160GB SATA 7200rpm HDD | **Operating System** | Genuine Windows Small Business Server Std 2003 |
| **HDD Controller** | 4-port SATA with RAID | | |
| **Optical Storage** | 48x CD-ROM drive | **Warranty** | 1 Year |
| **Ethernet** | NC320i PCI Express Gigabit Sever Adaptor | | |

**$1187** SAVE $212 off RRP
WebCode: HOS0289

## HP ML 110 G4 Server Bundle



| | | | |
|---|---|---|---|
| **Part Number** | 448030-011 | **Slot Totals** | 2 x PCI-E Slots, 2 x PCI-X Slots |
| **Processor** | Intel Core Duo 925 3.0GHz | | |
| **Memory Ram** | 1GB DDR2 | **Form Factor** | 4U Tower |
| **Hard Drive** | 2 x 160GB 7200rpm SATA HDD | **Operating System** | Genuine Windows Small Business Server Std 2003 |
| **HDD Controller** | 4-Port SATA Controller | | |
| **Optical Storage** | 48x CD-ROM drive | | |
| **Ethernet** | Gigabit Ethernet | **Warranty** | 1 Year |

**BUNDLED**
**HP ProCuve 1700-8 Switch**

**$1674** SAVE $486 off RRP
WebCode: HOB0137

## HP DL 320 G5 Server Bundle

| | | | |
|---|---|---|---|
| **Part Number** | 418044-371 | **Form Factor** | 1U Rack |
| **Processor** | Intel Dual Core Xeon 3050 2.13GHz | **Operating System** | Optional |
| | | **Warranty** | 3 Years Parts, 1 Year Onsite + Labour |
| **Memory Ram** | 1GB DDR2 | | |
| **Hard Drive** | 80GB SATA 7200rpm HDD | | |
| **HDD Controller** | Intel Integrated SATA Controller | | |
| **Optical Storage** | N/A | | |
| **Ethernet** | Dual Port Gigabit Server Adapter | | |
| **Slot Totals** | 2 x PCI-E Slots | | |



**$1842** SAVE $453 off RRP
WebCode: HOS0247

## HP ML 310 G4 Server



| | | | |
|---|---|---|---|
| **Part Number** | 418041-011 | **Form Factor** | 5U Tower |
| **Processor** | Intel Dual Core Xeon 2.13GHz | **Operating System** | Optional |
| | | **Warranty** | 1 Year |
| **Memory Ram** | 512MB DDR2 | | |
| **Hard Drive** | N/A | | |
| **HDD Controller** | 4-Port SATA RAID Controller | | |
| **Optical Storage** | 48x CD-ROM | | |
| **Ethernet** | Gigabit Ethernet | | |
| **Slot Totals** | 2 x PCI-E Slots, 2 x PCI-X Slots | | |

**$1927** SAVE $168 off RRP
WebCode: HOS0244

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City Software Business Solutions, part of the City Software Group is one of Australia's leading providers of SAP Business One and Business Management Solutions. Our primary focus is to provide your business with commercially proven, easy-to-use, reliable and affordable Business Management Systems and Solutions that have been designed with the sole purpose of enhancing your business.

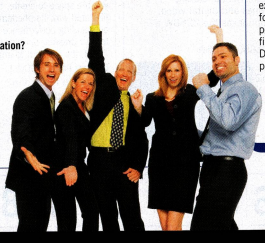
**Our solutions are designed to suit a range of industries:**

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- Importers
- Retailers
- Light Manufacturers
- Construction
- Engineering Services
- Professional Services

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  - Sales
  - Purchasing
  - Stock Control
- Workflow Automation
- Business Intelligence (BI)
- Warehouse Management
- Project Management
- Job Costing
- Payroll
- POS Retail Management
- e-Commerce Web Tools
- MS Office Integration
- Flexible Reporting Tools

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SAP has designed SAP Business One, a business management software application, specifically for small and midsize businesses. It's an affordable, easy-to-use way to manage critical business functions across sales, distribution, and financials – all in a single integrated software system. With SAP Business One, you can instantaneously access critical data that provides a complete and up-to-the-minute view of your business – so you can respond to customers faster and grow your business more profitably.

CHANNEL™ SAP PARTNER

**Workbench** is a comprehensive Job Costing system combined with a range of "Operational Management" modules, integrated into a number of different financial systems to provide a total business solution for any organisation involved in Jobbing. The software is designed to provide 'operational' staff with an appropriate management solution while continuing to meet the accounting needs of the organisation through the integration with a variety of external financial accounting systems, including SAP Business One.

Workbench Project Management Software

**BI Plus** is the breakthrough consolidated BI & Reporting Tool that does it all. BI Plus' philosophy is that dashboards need not be the exclusive domain of executives but are available to anyone with a need for reporting and importantly they are simple to configure. Corporate performance management showing snapshots of strategic operational, financial and corporate data via dashboards are made simple. Dashboards in BI Plus are created more easily than with any competing product

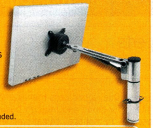
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CITY SOFTWARE BUSINESS SOLUTIONS

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## Spacedec Acrobat Swing Arm LCD Mount Desk Kit Combo

- Suits LCD Flat Panel
- Displays from 12" (30cm) to 22" (56cm)
- Suits 75mm x 75mm (3"x 3") and 100mm x 100mm (4"x 4") mounting hole patterns



*Monitor not included.

**$212** SAVE $27 off RRP
WebCode: ATD0008

## ViewSonic VX2835WM 28" LCD Monitor

Link to endless possibilities of future audio-visual! The ViewSonic VX2835wm 28" multimedia LCD display comes with a golden aspect ratio of 16:10, ultra-fast 3ms video response, and proprietary display technology. It is setting the new standards for digital aestheticism.

**Maximum Resolution:** 1920 x 900
**Response Time:** 3ms
**Brightness:** 500cd/m2
**Contrast Ratio:** 800:1



HOT

ViewSonic

**$962** SAVE $537 off RRP
WebCode: VIE3252

## Spacedec Acrobat Articulated LCD Mount Desk Kit Combo

- Suits LCD Flat Panel Displays from 12" (30cm) to 22" (56cm)
- Suits 75mm x 75mm (3"x 3") and 100mm x 100mm (4" x 4") mounting hole patterns
- Supports a maximum weight of 9kg (19.8lbs)



*Monitor not included.

**$262** SAVE $13 off RRP
WebCode: ATD0005

## Acer X193WB 19" Widescreen LCD Monitor

Everything is bigger and better on the Acer X193WB. The Panoramic viewable display is ideal for watching DVD movies – transporting you from your home into a small cinema. You will also be able to display 2 full pages of Microsoft Office Applications.

**Maximum Resolution:** 1440 x 900
**Response Time:** 5ms
**Brightness:** 300cd/m2
**Contrast Ratio:** 2000:1



acer

**$284** SAVE $105 off RRP
WebCode: ACM0095

## LG L1953H-BF 19" LCD Monitor

World first picture enhancing Chip for LCD Monitor Real Colour Management (RMC) express natural colours Adaptive Colour and Contrast Enhancement (ACE) function to enhance brightness and contrast. Ideal for mobile imaging in TV, Film (such as movie), Gaming, pictures and animation.

**Maximum Resolution:** 1280 x 1024
**Response Time:** 5ms
**Brightness:** 300cd/m2
**Contrast Ratio:** 2000:1



LG

**$333** SAVE $16 off RRP
WebCode: ASM0021

## Spacedec D-Horizontal LCD Monitor Stand

- Suits 2 LCD Flat Panel Displays from 12" (30cm) to 22" (56cm)
- Suits 75mm x 75mm (3"x 3") and 100mm x 100mm (4" x 4") mounting hole patterns
- Supports a maximum weight of 11.5kg (25.3lbs) each



*Monitor not included.

**$472** SAVE $27 off RRP
WebCode: ATD0006

## Samsung 226BW 22" LCD Monitor

Perfect for the Windows Vista operating system. The latest games and digital video, the 16:10 aspect ratio makes the 226BW a Wide Format Wonder.

**Maximum Resolution:** 1680 x 1050
**Response Time:** 2ms
**Brightness:** 300 cd/m2
**Contrast Ratio:** 3000:1




SAMSUNG

**$476** SAVE $323 off RRP
WebCode: SAM2170

## Samsung 245B 24" LCD Monitor

Bring yourself closer to your dreams with Syncmaster 245B. Allow its expansive 24" widescreen to give you the space to create, think, and enjoy in a more liberated way. Its phenomenal picture quality and outstanding performance will not only bring you closer to your dreams, but also to reality. With SyncMaster 245B, it's not hard to imagine.

**Contrast Ratio:** 3000:1
**Brightness:** 400 cd/m2
**Max Resolution:** 1920 x 1200
**Response time:** 5ms




SAMSUNG

**$738** SAVE $161 off RRP
WebCode: SAM2441

## ViewSonic 37" High Definition LCD TV

ViewSonic's HD ready N3740wb 93cm widescreen LCD TV brings brilliant, life-like colours for superb family entertainment to your home. HDMI provides extra flexibility plus crisp digital video and life-like audio quality. Intelligent image optimising technology and high-definition 1366 X 768 resolution guarantee smooth, blur-free HD motion video. Higher contrast ratios and excellent brightness levels let you see brighter and richer graphics. Numerous inputs such as HDMI (HDCP), dual SCART (with composite adapter), composite, S-video, component and even a PC-VGA connector give you full connectivity and the freedom of future-proof compatibility. Two powerful 10-watt stereo speakers driven by the innovative SRS WOW virtual surround sound system bring your viewing experience to another level.



ViewSonic

**$1142** SAVE $356 off RRP
WebCode: VIE3258

## 2C See IT 84" Projector Screen

The workhorse of the range, the See IT is a reliable, well priced pull down screen that gives you all the flexibility of the Switch IT but at a red hot price. Suitable for use in all sorts of places, and with any sort of output, from the overhead projector to computer games, the See IT will make what your are looking at bright, crisp and clear.

**100"** (TWC0002) **$187**



2C

**$157** SAVE $122 off RRP
WebCode: TWC0001

## ViewSonic PJ503 Projector

The ViewSonic PJ503D weighs only 2.5KG but packs big power into its compact package. With native SVGA 800x600 resolution and 1,500 lumens, the PJ503D is bright and powerful enough for virtually any situation. Advanced video features such as progressive scan and 3:2 pull down deliver smooth, crisp video performance.



ViewSonic

**$632** SAVE $267 off RRP
WebCode: VIE5011

## Epson EMP-S5 Multimedia Projector

EPSON

Designed for enjoying larger than life images that fill your office, classroom or home. The new EMP-S5 Projector provides improved brightness, superb image quality and multimedia capability at an affordable price.

- 2000 ANSI Lumens
- 400:1 Contrast Ratio
- 4000 Hour Lamp Life (Low Brightness)
- 800 x 600 Resolution
- 4:3 Aspect Ratio

*BONUS 100" 4x3 Projector Screen

*See csw.com.au/promotions



**$967** SAVE $232 off RRP
WebCode: EMP0005

## Konnet Fidelity HDMI Cable 1.5M

The Konnet Fidelity HDMI Cable allows direct connection between devices that have HDMI input and output

- High Quality HDMI Cable that offers signal stability and consistency with double ferrite core
- 24K gold plated connectors



**$112** SAVE $87 off RRP
WebCode: PWR0248

## Epson Dreamio EMP-DM1 Projector

EPSON

Portability, simple connectivity, CD/DVD player and speakers with an all in one design concept to create large screen experience like never before. It's now easier to achieve brilliant widescreen performance anywhere - anytime.

- 1000 ANSI Lumens (Dynamic)
- Built in DVD Player and Speakers
- 1280 x 1024 Max Resolution
- 16:9 Aspect Ratio
- Play DVIX files

*BONUS 100" 4x3 Projector Screen

*See csw.com.au/promotions



**$976** SAVE $523 off RRP
WebCode: EPS0027

## ViewSonic PJ678 Projector

The ViewSonic PJ678 is a powerful, high brightness 2500 lumen projector. A wide array of analogue PC and video connectors plus one digital input with support for HDCP (high-bandwidth digital content protection) make it an extremely versatile short-throw projector. Incorporation of the latest D5 LCD panel generation technology together with a native resolution of 1024 x 768 pixels guarantees rich, lifelike colours and razor-sharp images for both video and data.



ViewSonic

**$982** SAVE $417 off RRP
WebCode: VIE5022

## 2C Hang IT Projector Ceiling Mount

The perfect projector mounting solution which makes ceiling installations so easy. Suitable for any projector that can be inverted and has base mounting holes.

**White** (TWC0008) **$99**



2C

**$99** SAVE $30 off RRP
WebCode: TWC0007

# Digital Cameras & Smart Phones

## Sandisk Memory Cards

**Standard SD**
1GB (SIM0388) $13
2GB (SAN0030) $21
4GB (SAN0115) $36
8GB (SAN0116) $70



**Ultra II SD**
1GB (SIM5987) $23
2GB (SIM0457) $31
4GB (SAN0098) $53
8GB (SAN0101) $95



**Ultra II Compact Flash (CF)**
1GB (SIM1002) $24
2GB (SIM0691) $35
4GB (SAN0023) $57
8GB (SAN0037) $101



**Memory Stick Pro Duo**
1GB (SAN0025) $30
2GB (SAN0028) $41
4GB (SAN0053) $70
8GB (SAN0120) $146



**Ultra II Memory Stick Pro Duo**
1GB (SAN0065) $29
2GB (SAN0046) $46
4GB (SAN0066) $81



**Extreme III SD**
1GB (SAN0111) $32
2GB (SAN0112) $35
4GB (SAN0125) $58
8GB (SAN0126) $114



**Extreme III Compact Flash**
2GB (SAN0106) $44
4GB (SAN0107) $66
8GB (SAN0108) $111
16GB (SAN0110) $216



SanDisk

## Olympus Type M 2GB xD Card

You will appreciate the convenience of the new 2GB xD-Picture Card. This ultra-compact card allows you to capture much more and in higher resolution before the images must be downloaded or the card changed.

1GB (OLY0102) $33



OLYMPUS

$53 SAVE $26 off RRP
WebCode: OLY0083

## Panasonic Lumix DMC-TZ3

Panasonic's new DMC-TZ3 is the latest member of the award-winning Lumix TZ family of digital cameras, which is renowned for packaging a remarkable 10x optical zoom in a compact, stylish body. To further add to their appeal, TZ3 goes one step further to feature a 28mm wide-angle Leica DC lens for wide-angle shooting.




7.2 Megapixel
10x Optical Zoom
3" LCD Screen

EISA AWARD Best Product 2007-2008
COMPACT CAMERA
Panasonic Lumix DMC-TZ3

Panasonic

$538 SAVE $111 off RRP
WebCode: PAN0100

## Samsung S630

The Samsung S630 is a high resolution digital camera that is equipped with a true-colour filtered 6.0 mega-pixel CCD. You can use Samsung S630 to produce even better images and take detailed photos for printing up to poster size.

6 Megapixel
3x Optical Zoom
2.5" LCD Screen




SAMSUNG

$98 SAVE $67 off RRP
WebCode: SAM2572

## Olympus FE-270

When it comes to capturing the images of your life, don't settle for second-rate pictures. The FE-270 boasts 7.1 Megapixels to give you high-quality shots and a 3x optical zoom that provides extra flexibility when shooting at a distance. Meanwhile, the 2.5" LCD makes it easy to frame and review your pictures.

7.1 Megapixel
3x Optical Zoom
2.5" LCD Screen



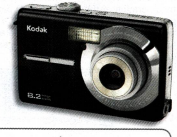

OLYMPUS

$137 SAVE $12 off RRP
WebCode: OLY0140

## Kodak Easyshare M853

The M853 is simple to use and packed with the features you need to get great looking pictures. Plus, it's pocketable and available in stylish colours with optional fun accessories all at a price you can afford.

8.2 Megapixel
3x Optical Zoom
2.5" LCD Screen




Kodak

$163 SAVE $16 off RRP
WebCode: KOD0853

## Canon IXUS 70

The 7.1 Megapixel IXUS 70 offers a sharp combination of cutting edge technology and ultra compact style. Featuring Canon's revolutionary UA lens technology, the fully retractable 3x optical zoom lenses delivers sharp, high resolution images.

7.1 Megapixel
3x Optical Zoom
2.5" LCD Screen




Canon

$316 SAVE $13 off RRP
WebCode: CAN0593

## Travroute Personal Navigation Device

Simply reach for your Travroute PND, key-in your destination and it will take you there providing turn-by-turn on-screen and spoken directions. New Travroute Personal Navigation Device is another premium solution by Travroute hosting features such as:

- Spoken Street Names, Distance and Direction to turn.
- 3 views including 3D/2D map display and written itinerary
- Options to use fastest / shortest route, avoid toll roads, avoid certain roads to route around construction or traffic and more
- Fast 400MHz processor
- Navteq Mapping with 99.7% coverage of Australian population
- Safety Camera alerts
- Displays Longitude/Latitude and speed whilst driving
- Driving Lane Assistance
- Walking and driving modes




TRAVROUTE Portable GPS Navigation Solutions

**$287** SAVE $162 off RRP
WebCode: TRA2000

## CoPilot Live 7 For Windows Mobile Device

CoPilot Live 7 gives you powerful, easy-to-use GPS navigation on your mobile device, which operates just like a dedicated or in-dash system. CoPilot Live 7 guides you to where you need to be with shortest route and on-screen directions whether you are in a car, cycling, or on foot, taking advantage of the latest GPS navigation technology.




COPILOT live

**$198** SAVE $71 off RRP
WebCode: CPL0002

## Palm Z22 + BONUS Hard Case

See your day at a glance. Create categories and assign each category a colour-like green for family and blue for work, to quickly spot different types of events. Enter repeating events just once. Remind yourself of appointments with an alarm. Now what paper calendar can do all that?

**BONUS** hard case included for a limited time only



palm

**$174** SAVE $24 off RRP
WebCode: USR6586

## HP iPAQ 112 Classic Handheld

Keep your life productive and organised with the HP iPAQ 112 Classic Handheld. Including Windows Mobile 6 with Outlook and Office Mobile, integrated Wi-Fi and Bluetooth 2.0 EDR networking, packed in its streamline, stylish body. Its large touch screen display also gives you ample room to view all your work and entertainment.



**$382** SAVE $17 off RRP
WebCode: COQ6094

## AVLabs Bluetooth GPS Adapter

The AVLabs Bluetooth GPS Reciever enables you to receive GPS data on your mobile phone, Pocket PC or Notebook wirelessly. This slim, light weight device makes navigation attractive and portable. With features like the Sirf star III chipset with ultra low power consumption, you can download your position faster and for longer with 10+ hours battery life.



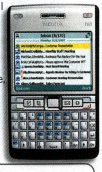
AV LABS

**$118** SAVE $31 off RRP
WebCode: AVL1000

## Nokia E61i Mobile Phone

Refreshed design. Effective attachment handling. Fast connections. Nokia E61i delivers an improved email experience.

- Experience improved email with One Touch keys and QWERTY keyboard
- WLAN and Email Wizards make setting up a breeze
- View and edit email attachments with Quickoffice, ZIP Manager and Adobe Acrobat Reader
- 3G Ready with 2 Megapixel Integrated Camera



NOKIA

**$632** SAVE $117 off RRP
WebCode: NOK0037

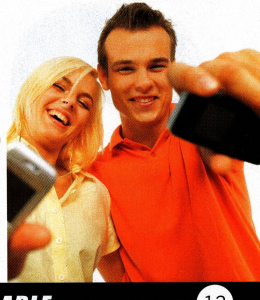
## HTC TyTN II Smartphone

More powerful than any mobile communications device you've seen before, the HTC TyTN II takes global connectivity to the next level. Staying connected means staying ahead. The TyTN II supports the full spectrum of network standards, guaranteeing that you will stay in touch ANYWHERE in the world including an internet connection via 3.5G HSDPA that is nine times faster than 3G.




htc

**$1233** SAVE $66 off RRP
WebCode: HTC0003



## iHome iH8 White iPod AM/FM Clock Radio

iHome8 Dual Alarm Clock Radio for your iPod or MP3 player with Remote Control and 12 AM/FM Presets and Equaliser. What better way to Rise and Shine to your favourite tunes



**Black**
(IH00002)
**$176**

iPod not included

iHome

**$176** SAVE $23 off RRP
WebCode: IH00001

## Apple iPod Touch 32GB

Authorised Reseller

**The iPod begs to be held.**

Flick through album covers and find your music. Watch your favourite music videos and more from the iTunes Store. Tap into thousands of photos. All using incredible multi-touch technology on a beautiful 3.5-inch display.

**Music**
If a picture says a thousand words, think of what all the album art in your collection might say. With Cover Flow on iPod touch, flick through your music to find the album you want to hear.

**Videos**
The 3.5-inch display gives you video like you've never seen on a portable device. Enjoy video podcasts. Play music videos. All using multi-touch technology

**Photos**
iPod touch holds up to 20,000 photos you sync via iTunes. Flick to scroll through thumbnails. Tap to view full screen. Rotate for landscape format.




**Apple iPod Touch 8GB** (APP0327) **$407**
**Apple iPod Touch 16GB** (APP0328) **$527**

**$608** SAVE $21 off RRP
WebCode: APP0365

## JBL Reference 220 Headphones – Black

- Amazingly comfortable in-ear design
- High-quality miniature transducers outperform other earphone systems
- Wear them your way: foam ear pads, silicone in-ear inserts, detachable ear cuffs or a foldable under-chin strap
- Three ear-piece sizes included, for a personal fit



**JBL Reference 220 White**
(JBL0045) **$114**

JBL

**$114** SAVE $25 off RRP
WebCode: JBL0044

## Logitech Pure-Fi Anywhere Compact Speakers for iPod

The Pure-Fi Anywhere speaker system uses a unique combination of speaker drivers to deliver clear sound with maximum bass and minimal distortion. Its compact size and long battery life make it the ideal companion to your iPod.



Logitech

iPod not included.

**$165** SAVE $64 off RRP
WebCode: LOG3668

## Harmon Kardon Go + Play

Harman Kardon Go + Play delivers tight, thunderous bass from high-excursion low-frequency drivers. Just as important, the highs are distinct and crystal clear. Go + Play is AC- or battery-operated, so it will go anywhere your iPod or other music player goes – and make your favourite music sound better when it arrives.

iPod not included.



harman kardon

**$547** SAVE $43 off RRP
WebCode: JBL0002



## SanDisk Sansa Clip MP3 Player 2GB

The colorful Sansa Clip is a tiny MP3 player that boasts an array of cool features, as well as distinctively big sound for its small size. Perfect for the fitness buff or traveler, the compact Sansa Clip comes with a fashionable clip for wearing anywhere.

Other features include: FM radio, microphone, long-lasting rechargeable battery and a bright screen for exceptionally easy navigation of tunes.

**1GB** (SAN0140) **$66**




SanDisk

**$96** SAVE $13 off RRP
WebCode: SAN0141

## Edifier M3200 2.1 Powered Speaker System

A wooden enclosure sub-woofer with 2-way 'slim-lady' satellites provides for a very cost effective audio solution for multiple applications. Powerful deep bass & exceptional highs for optimized PC Gaming.

- A 2.1 audio system designed with awesome audio content enclosed in a very unique design
- Wooden enclosure sub-woofer with styled plastic front panel with a 5½" driver producing deep and full bass characteristics
- Uniquely styled 2-way magnetically shielded satellites that are adjusted and tuned to provide rich and clear audio content
- Wired rotary master volume controller with 'red-halo' effect incorporating standby switch with built-in headphone output and MP3 input
- Total 34 Watts RMS



Edifier

$84 | SAVE $15 off RRP | WebCode: EDI0002

## AVLabs USB Sound Card

Eliminate the need for a traditional sound card with this USB 2.0 sound audio controller. Perfect for notebooks and with easy to use USB plug & play, upgrading any on-board soundcard to virtual 5.1 surround sound has never been simpler. Also, the built in speaker/headphone and microphone output make it even easier to use.

- Transforms analog sound signals to digital
- Windows Vista Compatible




AV LABS

$21 | SAVE $8 off RRP | WebCode: AVL1001

## Edifier M1350 2.1 Value Speaker System

A great solution for the budget minded buyer, the M1350 sacrifices nothing in the way of great sound quality and features. A wood enclosure subwoofer together with slim style satellites and wired volume controller, all add up to an exciting multimedia listening experience.



Edifier

$37 | SAVE $12 off RRP | WebCode: EDI0001

## Cyber Acoustics CA-5001 5.1 Speaker System

There is nothing more awesome than theatre surround sound. Utilizing the patented IDAT circuitry (Independent Dual Amplifier Technology) absolutely brings games and DVD's to life. 80 watts of power drive the 8" woofer for a thunderous bass response.



$162 | SAVE $27 off RRP | WebCode: EDI0003

## XPSound XP201- Phono PreAmp for Vinyl Transfer

The XP201 provides a combination of hardware and software to achieve high quality transfer of old records and cassettes to your home desktop PC or laptop in addition to offering a handy high quality microphone pre amp and headphone amplifier. The included software (Windows PC only) "Diamond Cut 32 V4.0" allows users to professionally edit their recorded audio.



$97 | SAVE $102 off RRP | WebCode: XPS0001

## Logitech Z-10 Interactive Speaker System

Touch-sensitive multimedia controls and presets give you unprecedented control of your digital music. The innovative LCD display shows song information, a digital clock and other useful information.



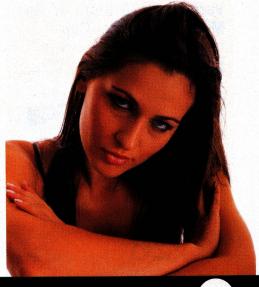
$197 | SAVE $102 off RRP | WebCode: LOG3593

## Logitech G51 5.1 Gaming Speaker System

Bring your games to life with 360-degree surround sound. Now hear your enemies sneaking up behind you, and listen for action in every direction. Frequency Directed Dual Driver (FDD2) sound technology creates a uniform soundfield anywhere in the room and eliminates the uneven response of conventional dual-driver design.



$234 | SAVE $65 off RRP | WebCode: LOG3669



## SanDisk Cruzer Micro U3 8GB

SanDisk Cruzer Micro design is a small, smart and secure USB Flash Drive.

- Small, compact light weight design
- New retractable USB slider eliminates the need for caps
- U3 smart enables you to take your portable applications on the go

**2GB** (SAN0061) **$21**

**4GB** (SAN0062) **$36**



SanDisk

**$61** SAVE $18 off RRP

WebCode: SAN0103

## SanDisk Extreme Ducati USB 4GB

**Passion for Performance**

SanDisk has teamed with Ducati Corse MotoGP to launch the most unique USB Flash Drive to date.

- Distinctive design inspired by Ducati motorcycles.
- Fast 20MB/sec sequential read/write speed.
- The fastest consumer USB Flash Drive SanDisk offers.
- Massive 4GB capacity




SanDisk

**$135** SAVE $14 off RRP

WebCode: SAN0104

## Verbatim 2GB Store 'n' Go Mini with Swivel Cap

The Store 'n' Go Mini is Verbatim's first cap less USB drive. It features a swivel designed cap which is attached to the drive, so the days of lost caps are gone! Versatile, yet easy to use, simply plug the Mini Store 'n' Go into any USB port, then drag and drop your folders and files.

**1GB** (VBM6052) **$18**




Verbatim

**$28** SAVE $11 off RRP

WebCode: VBM6051

## Verbatim 250GB USB Hard Drive

Expand the storage capacity of your laptop or desktop PC, with a sleek Verbatim Portable USB Hard Drive. Whether you are on the go or at home, rest assured that your favourite music, photos, video and critical data are safe. Each drive is constructed of a durable aluminium casing to provide protection during transport.

- Bus powered – no AC adapter or power cords required
- Includes CMS BounceBack Express Backup Software
- Increase the storage capacity of your laptop or desktop PC
- Transfer files between office & home
- Store and take music, photos, and video anywhere
- One Year Limited Warranty

**120GB** (VBM6062) **$152**

**160GB** (VBM6064) **$162**




NEW

Verbatim

**$253** SAVE $43 off RRP

WebCode: VBM6063

## LaCie 160GB Mobile Disk

The perfect travel companion for storing and transporting your files, the LaCie Mobile Disk delivers generous portable storage capacity at an affordable price.

- Back up, transfer and exchange files easily
- USB bus-powered; plug & play
- Sturdy metal, thin, lightweight design
- Synchronise & secure critical data on the go

**250GB** (LAC0793) **$192**



LACIE

**$126** SAVE $73 off RRP

WebCode: LAC0790

## Seagate 160GB Freeagent Go

Whether using a computer at work, school, a business center, an Internet cafe or library, have your desktop environment and latest files with you. Along with up to 160 glorious gigabytes, FreeAgent Go software lets you carry lots of great programs and all your browser favourites and passwords without having to haul around your computer. Now any PC can temporarily become your PC.



Seagate

**$152** SAVE $17 off RRP

WebCode: SGA0403

## WD Passport Portable 2.5" 320GB

Easy - Installation is a snap because you don't really "install" this drive; you just plug it in and it's ready to use. There is no CD to install; the included software loads from the drive the first time you plug it in. Smart - Powered by the USB bus. No separate power supply is needed. More Space - Capacities up to 320 GB means you can take even more of your photos, videos, files and music with you wherever you go.Ultra portable - This compact drive fits easily in your pocket or purse, weighs only a few ounces and holds tons of valuable data. Includes Google software - Search your drive, manage your photos, and simplify Web searches with included Google software. (Windows only).

**160GB** (WDD0079) **$145**

**250GB** (WDD0092) **$188**



NEW

Western Digital

**$268** SAVE $11 off RRP

WebCode: WDD0118

## LaCie Desktop Hard Disk Hi-Speed USB 2.0 500GB

**Compact & Easy To Use**

This efficient and simple USB desktop hard drive is compact and easy for anyone to use. One of the smallest desktop hard drives on the market, it offers a minimal footprint and light weight. Setup is nearly effortless; it's plug & play and ready to use just seconds after removing it from the box. LaCie '1-Click' Backup Software for PC and Mac is included for quickly saving files in one click.

**Hi-Speed USB 2.0 Universality**

With Hi-Speed USB 2.0 interface, this universal hard drive makes a great companion to your PC or Mac. Even use it as a reliable data shuttle between USB-equipped desktop and laptop computers. Advantages of Hi-Speed USB 2.0 include: universal compatibility, cross-platform convenience, hot-pluggable connections, and high speed transfer rates. This drive comes pre-formatted for use across Windows & Mac OS platforms.



LACIE

**$176** SAVE $53 off RRP
WebCode: LAC1110

## Tango USB Flash Drive 4GB

Pleasant, soft shape and vivid colours outlined by bold metal frame. Smooth feel. Classy, charming and slightly avant-garde.

**Features:**
- Designed to utilise the high bandwidth of USB 2.0 interface
- Capacity 4GB
- No Driver Required, except on Windows 98SE
- Bootable




**$32** SAVE $32 off RRP
WebCode: SIG0001

## Seagate 750GB Freeagent Pro

The FreeAgent Pro data mover provides anyone who's serious about their digital content with the freedom to stay connected to it. The FreeAgent Pro data mover automatically duplicates and moves content you select to multiple locations like email and contacts to your IPod, your entire "My Documents" folder to FreeAgent, or move it to your own online space where you can access it from any browser 24/7 or share it with anyone you choose.



Seagate

**$372** SAVE $27 off RRP
WebCode: SGA0411

## Maxtor 250GB OneTouch Dual Interface

Provide a safe haven for your entire working environment with a Maxtor OneTouch 4 Plus personal storage solution. Not only does the OneTouch 4 Plus provide backups, data storage, and protection for your files, it also protects your entire computer system in case of disaster. Firewire 400 and USB 2.0 interfaces compatible.




Maxtor

**$177** SAVE $12 off RRP
WebCode: MXT4007

## Sly'd USB Flash Drive (Blue) 2GB

This simple and clean project houses an intriguing mechanism which allows the flash drive to be opened with just two fingers.

**Features:**
- Designed to utilise the high bandwidth of USB 2.0 interface
- Capacity 2GB
- Bootable
- Small Footprint – 33mm x 12.5mm x 6mm (LxWxH)

**2GB Pink** (SIG0003) $22
**2GB Green** (SIG0004) $22
**2GB Silver** (SIG0005) $22



**$22** SAVE $27 off RRP
WebCode: SIG0002

## WD My Book Essentials 750GB

They're your photos, your music, your videos, your important files. Make extra room for them and keep them safe on My Book Essential Edition USB 2.0 external hard drive from WD. Easy to set up, easy to use - this drive is all about simplicity.
- Plug it into your computer's USB 2.0 port and start saving.
- Intelligent drive management features
- The My Book drive turns itself on and off with your computer.

**320GB** (WDD0084) **$132**
**500GB** (WDD0085) **$173**



Western Digital

**$241** SAVE $9 off RRP
WebCode: WDD0095

## Verbatim Store 'n' Go 8GB USB Drive

Store 'n' Go USB drives make transporting and sharing files simple and convenient
- 1GB - 8GB Capacity
- Ultra Slim Product Design for stacked USB ports
- Security feature to protect sensitive data
- Vista ReadyBoost compatible

**1GB** (VBM5138) **$16**
**2GB** (VBM0161) **$26**
**4GB** (VBM9523) **$48**




Verbatim

**$92** SAVE $67 off RRP
WebCode: VBM6030

## Linksys NAS200 - Network Storage System with 2 Bays

Now you can quickly and easily add storage space onto your network with the Linksys Network Storage System. This stand-alone network appliance features two available SATA hard drive bays so you can attach as much storage as you need now, and add more later as your storage needs grow.



LINKSYS

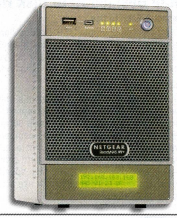
**$207** SAVE $42 off RRP
WebCode: LNK6256

## NETGEAR ReadyNAS 4-Bay Gigabit Desktop Network Storage 1.5TB

ReadyNAS NV+ was designed specifically for home offices, small businesses and workgroups. Never before has there been available a cost conscience Network Attached Storage (NAS) appliance packed with robust high-end server features, including Gigabit Ethernet, hardware RAID, system monitoring capabilities and built-in backup. ReadyNAS couples out of the box deployment and easy management with robust file serving and data redundancy.

- Serves files easily
- Backs up data effortlessly
- Streams music and video quickly
- Shares printers with ease
- Works with Windows, Mac, and Linux

**1TB** (NTG7998) **$1587**
**2TB** (NTG7999) **$2559**
**No Drive** (NTG8011) **$1385**



NETGEAR

**$2264** SAVE $435 off RRP
WebCode: NTG8031

## Evocept CopyBlast DVD/CD 2 Drive 16x Duplicator

Standalone DVD± DL Duplicator
Totally self contained with no additional hardware or software required

- 2 16x/DL DVD recordable drive - targets
- Simultaneous burning to any or all target drives at once
- CD/DVD backup in one button operation
- Supports a variety of disc formats



**$513** SAVE $36 off RRP
WebCode: EV00001

## D-Link DNS-323 2 Bay Network Storage Enclosure

- Secure and share your digital files
- Insert either one or two Sata hard drives without using any tools or attaching any cables
- Protect your important files by making regular backups to mirrored hard drives

**DNS-313 1 Bay Network Storage Enclosure** (DLK0313) **$181**

D-Link



**$327** SAVE $73 off RRP
WebCode: DLK0066

## WD My Book World Edition 1TB Ethernet HDD

Add this unique remote-access storage system to your wired or wireless network and you'll have a surprisingly simple and secure way to access and share data.

**2TB** (WDD0107) **$762**



Western Digital

**$398** SAVE $22 off RRP
WebCode: WDD0088



## LaCie 1TB Ethernet Big Disk

The LaCie Ethernet Big Disk is the essential storage solution for home and small business networking.

- Share files over Gigabit Ethernet
- Full support for Windows, Mac & Linux
- Stream your photos, music and videos
- Simple set-up with a quick Wizard Install

**2 TB** (LAC2001) **$1287**



LACIE

**$537** SAVE $262 off RRP
WebCode: LAC9869

## Maxtor Shared Storage II 1TB

- Store and automatically backup the data on networked computers to one location for MAC and PC
- Up to 1.5TB capacity with simple user Interface RAID 1 and 0
- 1 USB port for connecting and sharing printers and additional hard drives
- Gigabit Ethernet
- Media server plays back digital photos, music and video to networked media/ entertainment systems without a computer on.



Maxtor

**$541** SAVE $8 off RRP
WebCode: MXT0350

**D-Link DWA-140 RangeBooster N USB Adapter**



$111 SAVE $29 off RRP WebCode: DLK0090

**D-Link DWA-547 RangeBooster N 650 Desktop Adapter**



$111 SAVE $29 off RRP WebCode: DLK9205

**D-Link DWA-556 Xtreme N PCI Express Desktop Adapter**



$131 SAVE $29 off RRP WebCode: DLK0091

**D-Link DWA-643 Xtreme N Notebook ExpressCard**



$131 SAVE $29 off RRP WebCode: DLK0092

## D–Link Xtreme N Gigabit Router (DIR–655)

The D-Link Xtreme N Gigabit Router is a draft 802.11n compliant device that delivers up to 300Mbps and superior wireless coverage for larger environments & bandwidth-intensive applications. Backwards compatible with 802.11b/g, connected to a Cable/DSL modem provides high-speed internet access to PC's, gaming consoles and media players.



$247 SAVE $53 off RRP WebCode: DLK0064

## Billion BIPAC 7300GX 3G Router

The 7300GX is a 4 port ADSL2+ Wireless modem router with a 3G PC card slot. The 3G can be used when there are no ADSL or phone lines available and the wireless ensures that the whole family can enjoy broadband access anywhere. With the included car charger the router can be taken on the road. Ideal for the areas without ADSL or if you require continuous internet connection with 3G providing backup to ADSL



$209 SAVE $60 off RRP WebCode: BIL0029

## NETGEAR RangeMax Wireless ADSL2 + Modem Router

The DG834PN RangeMax Wireless Modem Router adjusts to interference and the physical barriers to maximize coverage. With RangeMax dynamic connectivity there is no need to spend extra money on range extenders, repeaters and external antennas.

**WPN511 PC Card** (NTG7327) **$66**
**WPN311 PCI Adapter** (NTG7316) **$66**
**WPN111 USB Adapter** (NTG7326) **$66**



$198 SAVE $31 off RRP WebCode: NTG7582

## NETGEAR RangeMax NEXT Wireless N Router

RangeMax NEXT extends the possibilities of your wireless home network by providing a Steady-Stream of up to 270 Mbps, and is compliant with draft 802.11n. This next generation wireless standard utilizes advanced MIMO (Multi-In, Multi-Out) technology, which delivers incredible speed and range.

**WN111 RangeMax Next Wireless N USB** (NTG8032) **$122**



$164 SAVE $35 off RRP WebCode: NTG7935

## D–Link DIR-300 Wireless G Router

**Basic wireless networking**

Create a wireless network for your home and share it securely with Tomizone using the D-Link Wireless G Router. Connect the Wireless G Router to a broadband modem and wirelessly share your high-speed Internet connection and enjoy surfing the web, checking e-mail, and chatting with family and friends online.



$75 SAVE $24 off RRP WebCode: DLK3006

**Telstra approved ADSL splitter/filter**
- Recommended for ADSL2+



$18 SAVE $7 off RRP WebCode: NET9481

**NetComm NB6W ADSL2+ Wireless Modem Router**
- Wireless 54G ADSL2+ Modem Router
- Built-in Firewall for security & peace of mind



$108 SAVE $69 off RRP WebCode: NET9511

**NetComm NP285 Turbo HomePlug Twin Pack**
- 85Mbps Ethernet over Power adapters



$178 SAVE $21 off RRP WebCode: NET9450

## NetComm 54G Wireless Firewall Router & Wireless USB Adapter

The NetComm NB504 54Mbps Wireless Router integrates a firewall, NAT-router, Wireless AP and is designed to be a dedicated Small Office/Home Office (SOHO) Wireless network solution. Combined with the NP545 Wireless USB Adapter you will be able to connect your network wirelessly better than ever, sharing Internet Access and connecting computers, easily and securely.

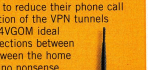


BONUS Wireless USB Adapter $49 Value

$116 SAVE $12 off RRP WebCode: NET9528

## Billion BIPAC 7404VGOM ADSL2+ VOIP Router

The 7404VGOM is a 4 Port ADSL2+, Wireless, VOIP modem router with VPN tunnels. This is for the small businesses looking at VOIP to reduce their phone call costs. The addition of the VPN tunnels makes the 7404VGOM ideal for secure connections between branches or between the home and office. The no nonsense firewall and wireless connectivity rounds up this as the best choice for the corporate market.



$306 SAVE $13 off RRP WebCode: BIL0020

## Belkin N1 Vision Broadband Router

The N1 Vision wireless router offers an easy way for you to view your network's broadband speed, computer bandwidth usage, and the status of your connected devices - all from an easy-to-read display. N1 Vision offers the best in networking performance with its wireless 802.11n 3x3 radio design and wired gigabit ports.




BELKIN.

$302 SAVE $47 off RRP
WebCode: BEL9515

## D-Link DHP 301 Powerline HD Network Starter Kit

Create a smooth and secure network with simple plug 'n' play Powerline technology and stream data into hard to reach areas of the home. Avoid unnessary Ethernet cables or expand a Wi-Fi network with speeds up to 200Mbps over existing electrical wires. Ideal for HD Video, music sharing and on-line gaming.

DHP-300 - Powerline HD Ethernet Adapter (DLK0096) $144




D-Link

$272 SAVE $57 off RRP
WebCode: DLK0098

## D-Link DFL-800 Firewall

The NetDefend family of Firewall/VPN Security Appliances is D-Links answer for hardware-based network security. The new D-Link DFL-800 Network Security Desktop VPN Firewall network security appliance is an easy-to-deploy VPN and firewall solution designed for small-to-medium sized businesses that demand superior performance and security.



D-Link

$1004 SAVE $195 off RRP
WebCode: DLK6059

## NETGEAR GS724T ProSafe 24 Port Gigabit Smart Switch

Joining NETGEAR's family of Smart Switches with simple switch management at no extra cost, this 24-port Gigabit switch is high on value and capability. With 24 10/100/1000 Mbps ports, each capable of powering 2000 Mbps of data throughput in full-duplex mode, plus two optional fiber ports, it allows you to deliver large amounts of multimedia, image, and video information in no time at all.



NETGEAR

$674 SAVE $155 off RRP
WebCode: NTG7158

**Linksys Wireless-N PCI Adapter (WMP300N)**

$126 SAVE $34 off RRP
WebCode: LNK5545



**Linksys Wireless-N Notebook Adapter (WPC300N)**

$127 SAVE $33 off RRP
WebCode: LNK5546



**Linksys Wireless-N USB Adapter (WUSB300N)**

$126 SAVE $34 off RRP
WebCode: LNK1235



## Linksys Wireless N Gigabit Router With Storage Link

Internet-sharing Router and 4-port Gigabit Switch, with a built in speed and range enhanced Wireless Access Point. Also connects hard drive or flash-based USB storage devices directly to your network to share music, video, or data files. MIMO technology uses multiple radios to create a robust signal that travels up to 4 times farther.



LINKSYS®

$285 SAVE $54 off RRP
WebCode: LNK6234

## D-Link DWL-3200AP Managed Access Point

D-Link unveils its new AirPremier DWL-3200AP 802.11g 108Mbps Managed Access Point, designed specifically for business-class environments such as large or enterprise corporations. Operable as either an AP or Wireless Bridge, and coupled with safety approved metal chassis and advanced security.



D-Link

$347 SAVE $82 off RRP
WebCode: DLK6041

## Linksys WRT150N Wireless N Router

- Internet-sharing Router and 4-port Switch, with a built in speed and range enhanced Wireless Access Point
- MIMO technology uses multiple radios to create a robust signal that travels up to 3 times farther and reduces dead spots
- Up to 9 times faster than Wireless-G.



LINKSYS®

$144 SAVE $25 off RRP
WebCode: LNK2141

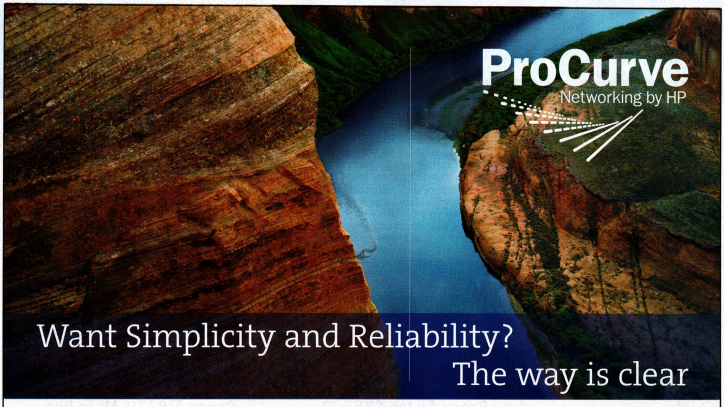
## Linksys WAG325N Wireless N ASDL 2+ Gateway

- High-speed ADSL2+ Modem gives you a fast, "Always On" connection to the Internet
- Connect your PCs via the built-in Router and 4-port Switch to jump start your Ethernet network and share the Internet throughout the building
- Built-in Wireless-N (draft 802.11n) Access Point also lets you connect without running wires -- up to 12 times as fast as Wireless-G



LINKSYS®

$206 SAVE $53 off RRP
WebCode: LNK6212








## Procurve Access Point and Switch Bundle

The Procurve Wireless Access Point and Switch Bundle is ideal for small enterprise networks that need quick deployment with minimal investment. Covered by the leading Procurve Lifetime Warranty*, The Wireless Access Point can be configured in minutes using intuitive Web Managed interface and is flexible and interoperable, it uses Power over Ethernet (PoE), allowing for maximum flexibility. The Procurve 1700 Series Switch is ideal for businesses making the transition from unmanaged to managed networks, designed with no fan, enables quiet operation for deployment in open spaces with an Industry-leading warranty.

**Procurve Access Point Specification**

- Supports Wi-Fi Protected Areas WPA or WPA2
- Supports 802.11a and 802.11b/g wireless standards
- Supports up to 8 SSIDs

**Procurve 1700-8 Switch Specifications**

- 7 auto-sensing 10/100 ports
- 1 auto-sensing 10/100/1000 port
- Media Type: ProCurve Auto-MDIX
- Duplex: half or full

Procurve Access Point and Switch Bundle

**Our Price $347.00** **Save $123.00**

WebCode.....HPE5500

*For as long as you own the product, with next-business-day advance replacement (available in most countries). For details, refer to the ProCurve Software License, Warranty, and Support booklet at http://www.hp.com/rnd/support/warranty/index.htm

Business Partner

**1300 761 761**

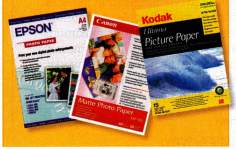
**http://www.csw.com.au/business**

CSW-IT

# Multifunction & Mono Laser Printers

## Inkjet Paper

| Description | WebCode | Price |
|---|---|---|
| **Canon Papers** | | |
| Canon 4x6 Glossy Photo Plus Cards (20 Sheets) | CAN0103 | $10 |
| Canon 5x7 Glossy Photo Plus Cards (20 Sheets) | CAN0162 | $16 |
| Canon A3 High Resolution Paper (20 Sheets) | CAN0111 | $10 |
| Canon A3 Glossy Photo Paper | CAN0194 | $26 |
| Canon A3 Pro-Quality Photo Paper (10 Sheets) | CAN0113 | $39 |
| Canon A4 Glossy Photo Paper | CAN0173 | $14 |
| Canon A4 High Resolution Paper (200 Sheets) | CAN0080 | $35 |
| **Epson Papers** | | |
| Epson 4x6 Premium Glossy Photo Paper | EPA1729 | $16 |
| Epson A3 Premium Semigloss Photo Paper | EPA2007 | $94 |
| Epson A3+ Premium Semigloss Photo Paper | EPA2006 | $119 |
| Epson Double-Sided Matte Paper | APA5063 | $34 |
| Epson 4x6 Ultra Glossy Photo Paper (50 Sheets) | EPA1943 | $20 |
| Epson 5x7 Premium Glossy Photo Paper | EPA5070 | $12 |
| Epson A4 Bright White Ink Jet Paper (500 Sheets) | EPA5030 | $19 |
| **Kodak Papers** | | |
| Kodak A4 Premium Photo Paper Glossy (20 Sheets) | KOD7729 | $14 |
| Kodak A4 Premium Photo Paper Glossy (50 Sheets) | KOD7737 | $26 |
| Kodak A4 Photo Paper Glossy (100 Sheets) | KOD7208 | $28 |
| Kodak 4x6 Photo Paper Glossy (20 Sheets) | KOD7175 | $7 |
| Kodak 4x6 Photo Paper Glossy (60 Sheets) | KOD6571 | $20 |




## Epson Stylus CX9300F - 4 Colour Multifunction Inkjet Printer

The Epson Stylus CX9300F is the multifunction printer that blends productivity enhancement and effortless useability for the small or home office. It combines economical Intelliedge individual ink cartridges, high resolution printing, and the versatility of scanning, copying and faxing capabilities, as well as an automatic document feeder for uncompromised functionality.

- DURABrite Ultra resin coated pigment ink
- Economical Intelliedge 4 individual ink cartridges
- Enhanced productivity with scanner, copier, fax & auto document feeder
- Up to 32ppm printing speed
- 2.5" LCD viewer with tilt adjustment
- Multi-format card reader
- PictBridge
- PC-free copying
- Up to 5760 optimised dpi print resolution
- USB cable included



EPSON

**$213** SAVE $16 off RRP
WebCode: EPI9300

## Epson Stylus CX5500

The Epson Stylus CX5500 is the multifunction printer delivering versatility and flexibility in the home and small or home office.

- 5760 optimised dpi printing resolution
- DURABrite Ultra resin coated pigment ink
- Economical Intelliedge 4 individual ink cartridges
- Enhanced productivity with scanner & PC-free copying
- Up to 25ppm printing speed
- USB cable included



EPSON

**$83** SAVE $6 off RRP
WebCode: EPI0055

## Canon MP470 All in One

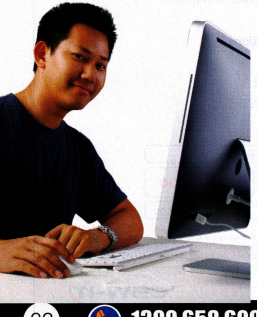
Convenient All-in-One direct photo printer with 1.8" LCD screen. Quality prints, copies and scans.

- 4800 x 1200 dpi resolution
- 2 picolitre FINE print-head technology for high quality photos and documents
- 1.8" colour LCD screen allowing preview and image correction before printing
- Scan high-quality photos and documents at up to 2400 x 4800 dpi



Canon

**$132** SAVE $17 off RRP
WebCode: CAN0666



## Epson Stylus Photo RX610

The Epson Stylus Photo RX610 is the ideal all-in-one multifunction solution for fast, high definition quality printing, copying and scanning.

- Fast print speeds of up to 38ppm
- 5760 optimised dpi print resolution
- Economical Intelliedge individual 6 colour cartridge system
- 4 x 6 photo prints from 12 secs
- 2.5" LCD viewer
- CD/DVD printing



EPSON

**$276** SAVE $22 off RRP
WebCode: EPI0610

## Brother MFC-685CW 9 in 1 Multi-Function Centre

This All-in-One offers a unique, low-profile design, without sacrificing a 10-page ADF.

- 30 ppm (mono) / up to 25 ppm (colour)
- 6000 x 1200 dpi (mono) / 6000 x 1200 dpi (colour)
- USB, Ethernet, Wi-Fi + USB host
- Scanning 600 x 2400 dpi
- Duty Cycle (max) 2500 impressions
- 3.3" LCD viewer



brother

*BONUS $50 Cashback (valid between 16/1/08 to 31/3/08)

*See csw.com.au/promotions

**$341** SAVE $58 off RRP
WebCode: BRT0165

## HP LaserJet P2014 A4 Mono Laser Printer

The HP LaserJet P2014 printer series is equipped to handle your most demanding workloads with remarkable ease and functionality. This fast and compact black-and-white laser printer delivers performance with clear results. Your perfect tool for affordable, everyday document printing.

- Print Speed: 23ppm
- First page out: Less than 8.5 seconds from sleep mode
- Resolution: 1200 dpi
- Connectivity: USB 2.0, Parallel
- Duty Cycle: Up to 10,000 pages per month
- Memory: 32MB std
- Paper Tray: 50 Sheet multi purpose, 250 Sheet input tray



**HP Laserjet P2014N Network Ready** (HPL4510) **$518**

**$441** SAVE $81 off RRP
WebCode: HPL4500

## Minimise your environmental impact with HP LaserJet Printers

HP has launched another initiative to help you minimise your environmental footprint. A customer who buys any HP LaserJet before 30 April 08 can claim a bonus offset carbon credit. This is representative of carbon emissions produced over the lifetime^ of the HP LaserJet printer being offset by HP through the purchase of carbon credits. HP is partnering with Climate Positive to source carbon credits, including Australian renewable energy projects, that helps to reduce greenhouse gas emissions. For more information visit www.citysoftware.com.au/promotions

^CO2 calculation is based on avg. energy consumption of printer (supplies & media excluded) as defined by the ENERGY STAR Program Requirements for Imaging Equipment, Version 1.0 Typical Electricity Consumption (TEC) over 5yr lifetime.

## Konica Minolta PagePro 1350W A4 Mono Laser Printer

The stylish PagePro 1350W personal laser printer is a simple to use, low cost, reliable printing solution for users needing to print a multitude of professional business documents efficiently.

- Print Speed: 20ppm
- Resolution: 1200 x 1200 dpi
- Connectivity: Parallel, USB 2.0
- Duty Cycle: Up to 15,000 pages per month
- Memory: 8MB std
- Paper Tray: 150 Sheet multi purpose



**$211** SAVE $18 off RRP
WebCode: QMS1350

## Brother HL-2170W A4 Mono Laser Printer

- Up to 22 ppm print speed
- Wireless Network Ready - Wireless LAN IEEE802.11b/g
- Wired Network Ready - Ethernet 10/100BASE-TX
- Up to 250 sheets standard input capacity
- Full-Speed USB 2.0
- Windows, Mac, DOS & Linux compatible
- First print out in less than 10 seconds



NEW

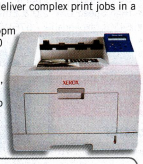
**$205** SAVE $44 off RRP
WebCode: BRT0167

## Fuji Xerox Phaser 3428DN A4 Mono Laser Printer

Providing a full-range of powerful features, including automatic two-sided printing, this handy printer will deliver complex print jobs in a hurry.

- Print Speed: 28ppm
- Resolution: 1200 x 1200 dpi
- Connectivity: 10/100 Ethernet, USB 2.0
- Duty Cycle: Up to 65,000 pages per month
- Memory: 32MB

Fuji Xerox Printers



**$644** SAVE $104 off RRP
WebCode: FXP3429

## Fuji Xerox DocuPrint 340A A4 Mono Laser Printer

Even though it is compact in size it is packed with features that will give you big performance while saving you money

- Print Speed: 34ppm
- Resolution: 1200 x 1200 dpi
- Connectivity: 10/100 Ethernet, RS232C, IEEE1284,USB
- Duty Cycle: Up to 150,000 per month
- Memory: 64MB std 320MB max

Fuji Xerox Printers



**$1270** SAVE $154 off RRP
WebCode: FXP0346



## NETGEAR FWG114P ProSafe Wireless Firewall + USB Print Server

One powerful device, NETGEAR's ProSafe Wireless Firewall + USB Print Server consolidates multiple connection features and gives users the ability to share secure wired and wireless network connections. Built into this firewall router is a 4-port 10/100 switch, an IEEE 802.11g wireless 54 Mbps access point, and an easy connection USB print server port that supports multiple print jobs simultaneously.



NETGEAR

**$178** SAVE $61 off RRP
WebCode: NTG7125

## Fuji Xerox DocuPrint C1110 A4 Colour Laser Printer

If you've ever wanted a hassle-free colour printer, now's your chance. Execute complex print jobs with ease, and perform routine maintenance in minutes.

- Print Speed: 16ppm mono / 12ppm colour
- Resolution: 9600 x 600 dpi
- Connectivity: 10/100 Ethernet, USB 2.0
- Duty Cycle: up to 40,000 pages per month
- Memory: 128MB std / 512 max
- Paper Tray: 250 Sheet multi purpose
- True Adobe PostScript 3.0

Fuji Xerox Printers



‡BONUS Simply purchase Fuji Xerox DocuPrint C1110 Colour Printer between 1st January 2008 and 31st March 2008 to receive a carbon neutral domestic return flight

*See www.csw.com.au/promotions for terms & conditions

**$445** SAVE $154 off RRP
WebCode: FXP1111

## Konica Minolta magicolor 2550EN A4 Colour Laser Printer

The magicolor 2550EN encompasses all of the important elements you should find in a powerful workgroup printer

- Print Speed: 20 ppm mono / 5 ppm colour
- Resolution: 9600 x 600 dpi
- Connectivity: Ethernet, USB 2.0, Parallel
- Duty Cycle: up to 35,000 pages per month
- Memory: 128MB std / 640 max
- Paper Tray: 200 Sheet multi purpose

High capacity toners included at this price



KONICA MINOLTA

**$786** SAVE $113 off RRP
WebCode: QMS2550

## Fuji Xerox DocuPrint C3210DX A4 Colour Laser Printer

Now get an affordable colour laser printer that does not compromise performance for cost.

- Print Speed: 30ppm mono 25ppm colour
- Resolution: 1200 x 1200 dpi
- Connectivity: Ethernet, USB 2.0
- Duty Cycle: 80,000 pages per month
- True Adobe PostScript 3.0
- Duplex standard



‡BONUS Receive a carbon neutral domestic return flight

*See csw.com.au/promotions

Fuji Xerox Printers

**$1179** SAVE $142 off RRP
WebCode: FXP3211

## HP Color LaserJet CP3505 A4 Colour Laser Printer

Get great value out of the box with 6,000 page print cartridges, and best optimised print quality by default with HP ImageREt 3600

- Print Speed: 21ppm mono / 21ppm colour
- Resolution: 1200 x 600 dpi
- Connectivity: USB 2.0
- Duty Cycle: 65,000 pages per month
- Memory: 256MB std / 1024MB max
- Paper Tray: 100 Sheet multi purpose



**CP3505N** (HPL0442) $1654
**CP3505DN** (HPL0443) $2157

**$1380** SAVE $69 off RRP
WebCode: HPL0441

## D-Link Wireless 108G Multifunction Print Server

- 4 USB 2.0 Printer Connections
- Share Up to 4 USB Printers, Multifunction Printers
- Supports Scanning Function of Multifunction Printers
- Easy Control & Printing of Scanned Documents
- Integrated 802.11g Wireless Interface
- Ethernet Connection to Wired Network



D-Link

**$191** SAVE $48 off RRP
WebCode: DLK9211

## Konica Minolta magicolor 5430 A4 Colour Laser Printer

It is now time to increase business performance for once and for all. KONICA MINOLTA introduces the revolutionary magicolor 5430DL to help improve your business and performance.

- Print Speed: 20ppm mono / 20 ppm colour
- Resolution: 2400 x 600 dpi
- Connectivity: Ethernet, USB 2.0
- Duty Cycle: Up to 60,000 pages per month
- Memory: 64MB std / 512MB max



KONICA MINOLTA

**$853** SAVE $145 off RRP
WebCode: QMS5430

## Brother HL-4040CN A4 Network Colour Laser Printer

- Up to 20ppm Mono & Colour Printer
- Up to 2400 x 600 dpi resolution
- High Speed USB 2.0 & Ethernet 10/100
- 64MB (expandable - 576MB)
- PCL6 Emulation
- 250 sheets tray

‡BONUS $100 cash back (valid between 16/1/08 to 31/3/08)



*See www.csw.com.au/promotions for terms & conditions

brother

**$726** SAVE $173 off RRP
WebCode: BRT0130

## Fuji Xerox WorkCentre PE220 A4 Mono Multifunction

The WorkCentre PE220 is big in performance and small in size making it suitable for small businesses and workgroups, branch offices and individual users.

- Print Speed: 20ppm
- Resolution: 600 x 600 dpi
- Scan resolution: 600 x 600 dpi
- Connectivity: USB 2.0, Parallel
- Duty Cycle: Up to 5,000 pages per month
- Memory: 16MB
- Paper Tray: 150 Sheet multi purpose
- Compatible with Win9x/ME, 2000, XP, Mac OS 10.3-10.5, Linux



Fuji Xerox Printers

**$388** SAVE $111 off RRP
WebCode: FXP1220

## Konica Minolta PagePro 1380MF A4 MFP

Combining print, copy and (colour) scan in one compact and stylish design the PagePro 1380MF fits perfectly on any desk. Buying one machine costs less than buying three individual ones.

- Print Speed: 20ppm
- Print Resolution: 600 x 600 dpi
- Copy Speed: 20cpm
- Scan Resolution: 1200 dpi
- Connectivity: USB 2.0
- Duty Cycle: Up to 15,000 pages per month



KONICA MINOLTA

**$297** SAVE $102 off RRP
WebCode: QMS9350

## HP LaserJet M1522n A4 Mono Multifunction

High-end HP LaserJet printing experience featuring innovative technology, high performance and reliable functionality.

- Print Speed: 23ppm
- Print Resolution: 600 x 600 dpi
- Copy Speed: 23cpm
- Scan Resolution: up to 1200 dpi
- Connectivity: 10/100 Ethernet, USB 2.0
- Duty Cycle: Up to 8,000 pages per month
- Paper Tray: 260 Sheet multi purpose




**$560** SAVE $39 off RRP
WebCode: HPL0372

## Fuji Xerox DocuPrint C2090FS A4 Colour Multifunction

Whether you're printing, copying, scanning or faxing, it gives you the freedom of full-featured performance to work at your very best.

- Print Speed: 25ppm 5ppm colour
- Print Resolution: 600 x 600 dpi
- Copy Speed: 20ppm mono 5ppm colour



*BONUS Receive a carbon neutral domestic return flight

*See www.csw.com.au/promotions for terms & conditions

Fuji Xerox Printers

**$1136** SAVE $182 off RRP
WebCode: FXP2090

## HP LaserJet M2727nf A4 Mono MFP

The HP LaserJet M2727 is a multifunction device that enables work teams to print, copy, fax and scan over a shared network.

- Print Speed: 26ppm
- Print Resolution: 1200dpi
- Copy Speed: 26cpm
- Scan Resolution: 1200 x 1200 dpi
- Connectivity: 10/100 Ethernet, USB 2.0
- Duty Cycle: Up to 15,000 pages per month
- Paper Tray: 250 Sheet input tray




**$916** SAVE $182 off RRP
WebCode: HPL0532

## Brother MFC-9840CDW A4 Colour MFP

Brothers NEW 6-in-1 Colour Laser Flatbed Wired and Wireless Network Ready Multi-Function Centre brings professional colour print, fax, copy and scan functions together, in a compact machine with wireless networking and full duplex capabilities.

- Up to 20ppm colour
- Colour Laser Duplex Printer
- Colour Laser Super G3 Duplex Fax
- Colour Flatbed Duplex Scanner
- PC Fax Send / Receive
- Colour Flatbed Laser Digital Duplex Copier
- Direct Print from USB Memory Drive or Pictbridge

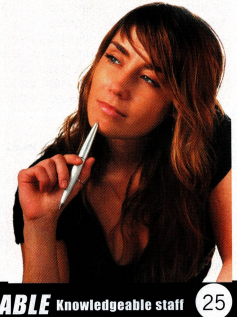



brother

*BONUS $200 cashback (valid between 16/1/08 to 31/3/08)

*See www.csw.com.au/promotions for terms & conditions

**$1417** SAVE $382 off RRP
WebCode: BRT0168

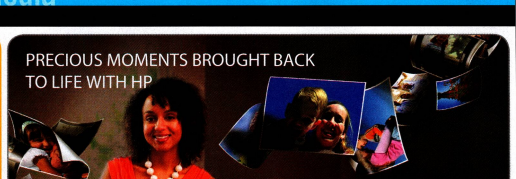


## HP Toner Cartridges

| Description | | Webcode | Price |
|---|---|---|---|
| C3906A | Black Toner | HP741 | $92 |
| C4092A | Black Toner | HPL4092 | $80 |
| C4096A | Black Toner | HPL4096 | $136 |
| C4127X | Black Toner | HPL4129 | $173 |
| C4129X | Black Toner | HPL4131 | $222 |
| C7115A | Black Toner | HPL7115 | $84 |
| C7115X | Black Toner | HPL7117 | $104 |
| C8061X | Black Toner | HPL8063 | $173 |
| C9720A | Black Toner | HPL9720 | $210 |
| C9721A | Cyan Toner | HPL9721 | $284 |
| C9723A | Magenta Toner | HPL9723 | $284 |
| Q1338A | Black Toner | HPL1338 | $208 |
| Q2610A | Black Toner | HPL2610 | $163 |
| Q2612A | Black Toner | HPL2612 | $95 |
| Q2613A | Black Toner | HPL2613 | $97 |
| Q2613X | Black Toner | HPL2614 | $121 |
| Q2670A | Black Toner | HPL2670 | $179 |
| Q2683A | Magenta Toner | HPL2683 | $231 |
| Q3960A | Black Toner | HPL3960 | $112 |
| Q3961A | Cyan Toner | HPL3978 | $135 |
| Q3962A | Yellow Toner | HPL3979 | $135 |
| Q3963A | Magenta Toner | HPL3981 | $135 |
| Q3972A | Yellow Toner | HPL3976 | $100 |
| Q3973A | Magenta Toner | HPL3977 | $100 |
| Q5942A | Black Toner | HPL5942 | $202 |
| Q5942X | Black Toner | HPL5943 | $306 |
| Q5945A | Black Toner | HPL5945 | $276 |
| Q5949A | Black Toner | HPL5949 | $97 |
| Q5949X | Black Toner | HPL5994 | $177 |
| Q5950A | Black Toner | HPL5950 | $241 |
| Q5951A | Cyan Toner | HPL5951 | $341 |
| Q5952A | Yellow Toner | HPL5952 | $341 |
| Q5953A | Magenta Toner | HPL5953 | $341 |
| Q6000A | Black Toner | HPL6060 | $103 |
| Q6001A | Cyan Toner | HPL6061 | $112 |
| Q6002A | Yellow Toner | HPL6062 | $112 |
| Q6003A | Magenta Toner | HPL6063 | $112 |
| Q6470A | Black Toner | HPL6470 | $179 |
| Q6511A | Black Toner | HPL6511 | $168 |
| Q7581A | Cyan Toner | HPL7581 | $231 |
| Q7582A | Yellow Toner | HPL7582 | $231 |
| Q7583A | Magenta Toner | HPL7583 | $231 |

## HP Ink Cartridges

| Description | | Webcode | Price |
|---|---|---|---|
| HP 78 | Tri-Colour | HPD6578 | $46 |
| HP 23 | Tri-Colour | HPI1826 | $46 |
| HP 45 | Black | HPD095 | $42 |
| HP 15 | Black | HPD6645 | $39 |
| HP 28 | Tri-Colour | HPI8782 | $30 |
| HP 27 | Black | HPD8772 | $26 |
| HP 56 | Black | HPD6656 | $28 |
| HP 57 | Tri-Colour | HPI6657 | $46 |




**Purchase**
5 specially marked HP Toner Cartridges

$150 OR

**Receive**
A Kaiser Baas 10.4" Digital Photo Frame or $150 cashback
RRP $399

**Purchase**
15 specially marked HP Toner Cartridges

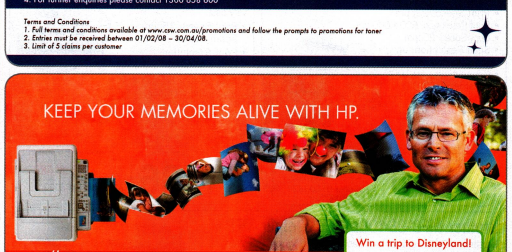
$500 OR

**Receive**
A Digital Nikon DSLR D40X or $500 cashback
RRP $1099

### To take advantage of this great offer, simply follow these instructions:

1. Purchase from our range of specially marked HP original Toner Cartridges and redeem between 1st February 2008 & 30th April 2008
2. Visit www.citysoftware.com.au/promotions and follow the prompts to promotions for toners
3. Register your details and enter your special promotional code (located on the sticker on the outside of the toner box)
4. For further enquiries please contact 1300 658 600

*Terms and Conditions*
*1. Full terms and conditions available at www.csw.com.au/promotions and follow the prompts to promotions for toner*
*2. Entries must be received between 01/02/08 – 30/04/08.*
*3. Limit of 5 claims per customer*




**Win a trip to Disneyland!**
You could be going to Disneyland Hong Kong, 2 adults, 2 children, 5 days/4 nights, business class, includes $2000 spending money. Total value $27,000

**Purchase**
Any 3 specially marked HP Ink Cartridges
Look for the pink banner on the packaging as pictured below.

**Receive**
A HP A320 Photo Smart Printer
RRP $119

To receive your HP A320 printer and to go into the draw to win a trip to Disneyland Hong Kong for a family of four, simply follow these instructions:

1. Purchase any 3 specially marked HP ink cartridges (look for the pink banner on the packaging)
2. Visit www.citysoftware.com.au/promotions and follow the prompts to the ink promotion
3. Register (once only) your details to become a user, or login if you're an existing member
4. Enter the 3 special promotional codes (located inside the box) on all marked HP ink cartridges (look for the pink banner on the packaging) supplies and follow the prompts to the ink promotion for details to become a user, or login if you're an existing member using optional codes (located inside the box)

*Terms and Conditions*
*1. Full terms and conditions are available at www.csw.com.au/promotions follow the prompts to the promotions for ink*
*2. Entries must be recieved between 01 February - 30 April 2008*
*3. Maximum claim per person is 1*

## Verbatim 8GB Secure Digital (SDHC) Card

SD is an increasingly popular storage choice among Digital Still Camera, Digital Video Camera, MP3 player, and handheld device makers.

- Ultra Compact (Postage Stamp Sized) Form Factor
- Write Protect Switch prevents accidental data deletion
- Verbatim Limited Lifetime Warranty

**1GB** (VBM6033) **$12**
**2GB** (VBM6034) **$23**
**4GB** (VBM6035) **$44**




Verbatim

**$92** SAVE $22 off RRP
WebCode: VBM6061

## Verbatim 2GB Mini Secure Digital (SD) Card

MiniSD is an increasingly popular removable storage solution for mobile devices. By simply adding or upgrading to a higher capacity miniSD card, you can easily increase your storage capacity for files, video, images, games and music. Verbatim miniSD cards are compatible with all miniSD slot equipped mobile devices.
By using the included miniSD to SD Adapter, you can also use the miniSD card in any SD slot equipped camera, card reader or computer.

**1GB** (VBM6036) **$14**




Verbatim

**$25** SAVE $9 off RRP
WebCode: VBM6037

## Imation CD-R Inkjet Printable 50 Spindle

**Images, music and more**

Imation CD-R discs store data swiftly and permanently with 1x to 52x write speeds. Our media offers you great performance with low failure rates.




imation

**$20** SAVE $10 off RRP
WebCode: MMM0413

## Verbatim 8GB Compact Flash (CF) Card

Verbatim Compact Flash Memory Cards are the perfect storage solution for digital devices that need high capacity flash memory. Each card features an integrated controller, which performs the flash management and interface functions, and is optimised for highest performance. Verbatim Compact Flash Memory Cards can be used in any device containing a Compact Flash slot and are 100% compatibility guaranteed.

- Rugged - withstands up to 2000 G's operating shock
- Data Transfer rates: 12MB/sec (to host); 10MB/sec (from host)- 40X
- Verbatim Lifetime Warranty

**1GB** (VBM6058) **$27**
**2GB** (VBM7012) **$47**
**4GB** (VBM7056) **$77**




Verbatim

**$116** SAVE $13 off RRP
WebCode: VBM6060

## Excel DVD–R 8X 50 Spindle

The ideal choice for high resolution video and images. Create, edit and archive home movies & digital photos while storing and accessing data from one disc. DVD–R discs capture 4.7GB. White Printable surface.




**$19** SAVE $20 off RRP
WebCode: EXC0001

## Verbatim 1GB Micro SD Card

A popular removable storage solution for mobile devices

- Includes adaptor for use in standard SD card slot
- Verbatim Limited Lifetime Warranty

**Verbatim 2GB Micro SD Card** (VBM6039) **$35**

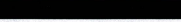



Verbatim

**$20** SAVE $9 off RRP
WebCode: VBM6038

## Verbatim CD/DVD Markers 4 Pack

- Pack of 4 coloured CD/DVD Markers (one of each blue, black, green and red)
- Water Based
- 0.5mm fine-point soft tip
- Permanent, non-toxic
- Guaranteed 100% safe for writing on CDs and DVDs

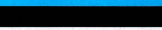



Verbatim

**$5** SAVE $1 off RRP
WebCode: VBM1830

## Imation DVD+R Inkjet Printable 50 Spindle

Print directly onto Imation inkjet printable CD or DVD discs using a CD/DVD printer. Imation printable discs offer outstanding graphics reproduction and system compatibility.




imation

**$26** SAVE $12 off RRP
WebCode: MMM6353

## Logitech Cordless Number pad for Notebooks

The Cordless Number Pad for Notebooks has convenient shortcut keys that enable effortless data entry to Microsoft Excel, calculator, and Internet Explorer.



$34 SAVE $15 off RRP
WebCode: LOG3632

## Microsoft Natural Ergonomic Keyboard 4000

- Ergonomic "split design"
- Inbuilt Scroll wheel
- New key layout improved for Ergonomic enthusiasts
- New 14 degree gable and proprietary "gull wing" design
- New cushioned wrist rests
- Wired USB



$48 SAVE $12 off RRP
WebCode: MST8406

## Logitech Cordless Desktop LX 310 Laser

Enjoy one-touch access to your favorite digital music. Use customisable function keys to open applications, files, and folders instantly. Experience unmatched precision and control with the cordless laser mouse.



$68 SAVE $31 off RRP
WebCode: LOG3628

## IRISCard Mini 4 Business Card Scanner

**Scan your business cards into Outlook, Address Book and many more!**

The IRISCard Mini 4 is incredibly fast, super portable and totally accurate! The IRISCard quickly scans your paper business cards, captures the information they contain and creates electronic contacts in your favourite contact manager.

**IRISCard Pro 4**
(PWR0243) **$278**
**IRISCard Corporate 4**
(PWR0245) **$418**



$182 SAVE $17 off RRP
WebCode: PWR0244

## Logitech Cordless Desktop Wave

A revolutionary advance in keyboard design, the Logitech Wave key design instinctively guides your hands into a natural position for enhanced comfort and productivity.



$126 SAVE $53 off RRP
WebCode: LOG3655

## Microsoft Wireless Entertainment Desktop 8000

The Microsoft Wireless Entertainment Desktop 8000 is the ultimate rechargeable keyboard and mouse for Windows Vista and PC entertainment. Designed to make it easier than ever to control PC media from your desk, your lap - or even from the comfort of your couch.



$356 SAVE $93 off RRP
WebCode: MST8456

## Wacom Bamboo Creative Fun 6 x 9 Black

Bamboo Fun is perfect for hobbies. It's simple, easy-to-use design lets you inspire yourself and other people. Retouch photos, draw, paint and be more expressive. It's the Bamboo for people who want to make their hobbies come alive. Bamboo Fun comes with a pen stand, USB cabling, a mouse and a tailored one-on-one tutorial. Create your world.



$268 SAVE $31 off RRP
WebCode: WAC2005

## Wacom Intuos3 6 x 8 Tablet - Student

Intuos3 is the industry standard graphics tablet for digital art, animation, image editing and computer graphics. The Intuos3 features ExpressKeys and Touch Strip(s) can substitute all common modifiers and shortcuts, whilst the ergonomic pen delivers professional level functionality.

***BONUS 2 Hoyts Movie Tickets**
**Via redemption offer expires 31st March**

See csw.com.au/promotions for Terms and Conditions



$327 SAVE $22 off RRP
WebCode: WAC9983

## Wacom Cintiq 12WX

Thin and light, the new Cintiq 12WX gives you the flexibility to work directly on screen as you would on paper. Easily rotate your display when working flat on your desktop to find the right position for your hand, or for grater comfort, recline the Cintiq 12WX on the desktop. Ergonomically designed for maximum comfort, it's even light enough for use on your lap.



$1648 SAVE $151 off RRP
WebCode: WAC9977

## Microsoft Mobile Memory Mouse 8000

This comfortable, ground-breaking mouse is the most advanced mobility tool available. Its transceiver also has a 1 GB Flash Memory, which frees up USB ports and lets you easily back up and transfer files. You can even continue to work while your mouse is charging.

- Transceiver with 1GB Flash Memory
- 2.4 GHz Wireless Technology
- USB Rechargeable with Magnetic Connectors
- High Definition Laser Technology
- Battery Life Indicator




Microsoft

$119 | SAVE $30 off RRP | WebCode: MST8472

## Logitech 2.4GHz Cordless Presenter

Take advantage of its 50 foot range to control your presentations while moving around an auditorium with confidence. A built-in LCD timer with vibration alerts helps you effectively manage your time. Storable receiver, carry case and On/Off button for complete portable control.



Logitech

$72 | SAVE $27 off RRP | WebCode: LOG3495

## Logitech VX Nano Cordless Laser Mouse for Notebooks

The mouse's plug-and-forget nano-receiver provides highly mobile notebook PC and MacBook users with a mouse that simplifies life on the road.

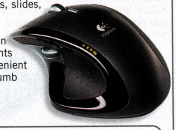


Logitech

$88 | SAVE $41 off RRP | WebCode: LOG3653

## Logitech MX Revolution

Smarter, faster, and fully-loaded, the MX Revolution gives you powerful new controls that will streamline the way you work. Logitech's innovative MicroGear Precision Scroll Wheel lets you fly through long documents at hyperspeed, or switch to precise click-to-click scrolling for navigating lists, slides, and image collections. Toggle between open documents with the convenient Quick-Flip thumb wheel.



Logitech

$106 | SAVE $43 off RRP | WebCode: LOG3583

## Targus Voice Recording Presenter with Laser Pointer

The Targus Voice Recording Presenter with Laser Pointer controls your PowerPoint presentations up to 15m (50 feet) away. Simply plug an SD memory card (not included) into the integrated card reader and voice record your presentations, notes, meetings and reminders ideal for students and teachers.



Targus

$83 | SAVE $36 off RRP | WebCode: TAR5072

## Microsoft Bluetooth Notebook Mouse 5000

- Transceiver-free and confident wireless connection to your Bluetooth PC.
- More responsive, more precise, and smoother tracking
- Battery light indicates when your battery is running low and an on/off switch helps you conserve power.
- 4 Buttons



Microsoft

$57 | SAVE $12 off RRP | WebCode: MST8245

## Microsoft Natural Wireless Laser Mouse 6000

- Revolutionary Ergonomic Design
- Instant Viewer
- 4-Way Scrolling
- Magnifier
- Battery Life Indicator



Microsoft

$77 | SAVE $22 off RRP | WebCode: MST8438



## Kaiser Baas 1.5" Digital Photo Key Ring – Pink

The Kaiser Baas Digital Photo Key Ring is the ideal gift. It is perfect for displaying holiday photos, baby shots or party pictures and presenting them to friends and family in a slideshow. Smaller than a matchbox, it can store up to 70 pictures, offering a different image every time a person looks at it.




NEW

**$29.95** WebCode: KAB0014

## Kaiser Baas 8.0" Digital Photo Frame - Black

The perfect complimentary product for digital cameras. Forget about printing your digital photos then buying a static frame for it. What about the hundreds of other great shots you took? Show all your digital photos as slideshows with background music in these 2 contemporary design digital photo frames.

- 8.0" LCD screen
- Interchangeable frames (sold separately)

**10.4"** (KAB0005) **$347**
**15"** (KABO006) **$443**



**$274** SAVE $25 off RRP
WebCode: KAB0002

## Kodak EasyShare Digital Picture Frame (7")

**Life in motion - frame by frame.**

- Start viewing your pictures and videos right away
- Play MP3s with built-in speakers
- Full of features such as Wi-Fi (10" Only) and editing capability

**8"** (KOD0080) **$277**
**10"** (KOD0100) **$369**



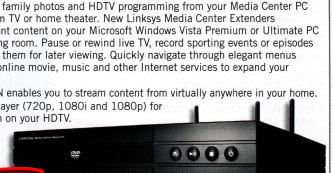
**$183** SAVE $16 off RRP
WebCode: KOD0070

## Linksys DMA2200 Media Center Extender with DVD

Access movies, your music library, family photos and HDTV programming from your Media Center PC and stream it all to your living room TV or home theater. New Linksys Media Center Extenders give you access to the entertainment content on your Microsoft Windows Vista Premium or Ultimate PC to enjoy in the comfort of your living room. Pause or rewind live TV, record sporting events or episodes of your favorite TV shows and save them for later viewing. Quickly navigate through elegant menus and programming guides. Access online movie, music and other Internet services to expand your entertainment options.

- High speed, dual-band Wireless-N enables you to stream content from virtually anywhere in your home.
- Built-in, Upscaling DVD-Video player (720p, 1080i and 1080p) for watching DVDs in high-definition on your HDTV.
- Includes learning remote control

**DMA2100 – NO DVD**
(LNK6270) **$316**



NEW

**$372** SAVE $77 off RRP
WebCode: LNK6271

## Logitech Harmony 555 Universal Remote

The Logitech Harmony 555 remote features a modern, slim design – complementing the sophisticated decor of today's most popular home-theater devices. The Harmony 555 has a stair-step shaped surface on the base of the remote that provide natural grips for fingers, making it easy to hold and physically navigate the remote with a single hand.



NEW

**$170** SAVE $79 off RRP
WebCode: LOG3618

## Logitech QuickCam Pro 9000

With the Logitech QuickCam Pro 9000 you can enjoy image-perfect detail and clarity. Carl Zeiss optics and autofocus keep images razor-sharp, even in extreme close-ups.

- Ultra-high resolution 2-megapixel sensor with
- RightLight 2 Technology
- 24-bit true color
- Up to 1600 x 1200 pixels (HD quality) (HD Video 960 x 720 pixels)
- Up to 30 frames per second
- 8 million pixels still image capture
- Built-in microphone with RightSound Technology



**$108** SAVE $41 off RRP
WebCode: LOG3650

## DViCO TVIX PVR4130 with in-built HD Tuner HDMI

- Ultimate Digital Jukebox for Movie, Music, Image and DVD Backup files
- Decoding and viewing almost all formats of MPEG1/ MPEG2/ MPEG4/ XVID files
- Support high-definition AVI files up to 1920 x 1080



**$587** SAVE $58 off RRP
WebCode: DVC0034

## Microsoft LifeCam NX-3000

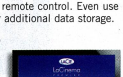
- VGA video resolution (640 x 480 pixels)
- High Definition 1.3 megapixel still photos (1280 x 960 pixels, interpolated)
- Built-in microphone with acoustic noise
- Automatic face tracking cancellation
- Automatic audio control for enhanced sound clarity



**$58** SAVE $21 off RRP
WebCode: MST8476

## LaCie LaCinema Premier 500GB

Easily turn your TV into an entertainment centre for enjoying your movies, photos and music in comfort. Simply connect the LaCinema Premier to your PC or Mac via USB to transfer your digital media files; then plug it into your TV for instant playback. Designed with HDTV screens in mind, it can adapt video content up to a 1080i resolution. Enjoy surround sound thanks to its optical output capability. Fun and simple for anyone to use, it provides an easy-to navigate on-screen menu and convenient remote control. Even use it as an external hard drive for additional data storage.


SCREEN SHOT

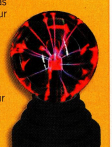


LACIE

**$336** SAVE $33 off RRP
WebCode: LAC0124

## USB Plasma Magic Ball

Powered by your USB port (or 2 AA batteries) this Plasma ball light will create a unique and fun environment on your desk or workstation. Watch with amazement as the electricity follows your finger tips across the 3-inch glass ball. This USB Lightening Ball is small enough to not take up too much desktop space, and is big enough to amaze your co-workers with its awe inspiring light show.



**$17** SAVE $2 off RRP
WebCode: ANY0487

## Kaiser Baas USB Dual HD TV

Watch one High Definition TV channel while recording another. Plug this stick into an available USB slot on your PC or notebook, and schedule, record, time-shift and watch two of your favourite TV shows. Supplied with CyberLink PowerCinema 5 TV entertainment software for the digital home.

- Power Supplied By USB no additional power required
- Vista Ready

**USB HD TV Tuner**
(KAB0009) **$62**

**USB Hybrid TV Tuner**
(KAB0010)
**$121**



kaiser baas

**$132** SAVE $23 off RRP
WebCode: KAB0011

## Kaiser Baas Dual ExpressCard HD TV Tuner

Watch one High Definition TV channel while watching another on your Notebook. Plug this ExpressCard into your notebook/laptop available ExpressCard slot and schedule, record, time-shift and watch two of your favourite TV programs. Supplied with CyberLink PowerCinema 5 TV entertainment software for the digital home.

**ExpressCard TV Tuner**
(KAB0012) **$106**



kaiser baas

**$163** SAVE $26 off RRP
WebCode: KAB0013

## Excel DVD–R 8X 50 Spindle

The ideal choice for high resolution video and images. Create, edit and archive home movies & digital photos while storing and accessing data from one disc. DVD–R discs capture 4.7GB. white Printable surface.




**$19** SAVE $20 off RRP
WebCode: EXC0001

## Neuros OSD

Record, Play, Stream and Share video, music and photos between home entertainment centres, PCs and portables such as laptops, iPods, smartphones, and PSPs. In addition to watching YouTube and other downloaded or PC-based content on your TV, users can also easily record TV shows, videos, and home movies from virtually any source (cable or satellite TV, DVD, DVR/TiVoTM, VCR, game console, camcorder, etc) to enjoy them anytime, anywhere on devices they already own.



neuros

**$328** SAVE $21 off RRP
WebCode: LAK0013

## DViCO TViX PVR5130 Digital Jukebox 320GB

- Ultimate Digital Jukebox for Movie / Music / Image / DVD Backup files
- Decoding and viewing almost all formats of MPEG1/ MPEG2/ MPEG4/ XVID files
- Decoding and viewing of recorded high definition transport stream files
- Support high-definition AVI files up to 1920X1080
- Playback the DVD backup files in HDD just like DVD (DVD Jukebox functionality)



DViCO

**$726** SAVE $73 off RRP
WebCode: DVC0036

## Compro VideoMate E700 Digital PCI-E Digital Tuner

Compro VideoMate E700 is a dual PCI-E DVB-T tuner card, which brings 2 high-quality main channels digital terrestrial TV watching on your desktop PC. It turns your computer into a home entertainment center by bringing digital TV viewing, power up scheduling, remote power on/off, and personal digital video recording (DVR) capabilities.

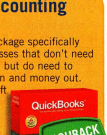



**$157** SAVE $22 off RRP
WebCode: ANY0486

## QuickBooks Accounting 2007/08

An effective software package specifically tailored for small businesses that don't need payroll or stock tracking, but do need to track more than money in and money out.

- Compatible with Microsoft Win 2000/XP/Vista.
- 12 months free technical phone support and upgrades.




***BONUS** upgrade to QuickBooks 2008/09 upon release

Offer ends 16th March 2008, *See www.csw.com.au/promotions

Reckon

You Pay $266

**$191**

*After $75 Cashback

SAVE $108 off RRP

WebCode: QUI0127

## QuickBooks EasyStart 2007/08

Designed for first-time users of accounting software, EasyStart includes simple, practical tools to manage essential business tasks. No confusing set-up. Just common sense tools that are easy to set up and easy to use.

- Manage GST and BAS
- Reconcile bank account
- Compatible with Microsoft Windows 2000/XP/Vista




***BONUS** $25 Cashback

Offer ends 16th March 2008, *See www.csw.com.au/promotions

Reckon

You Pay $112

**$87**

*After $25 Cashback

SAVE $42 off RRP

WebCode: QUI0126

## Quicken Home & Business 2008

Quicken Home & Business 2008 business cash flow, home finances & investments combines the best of investing and basic business cash flow management to assist you in combining your personal and business finances, allowing you to obtain a complete picture of your financial wealth. It is designed specifically for businesses that operate using a cash-basis accounting method and do not require reporting on outstanding invoices.

**Upgrade** (QUI0147) **$194**




Reckon

**$398**

SAVE $51 off RRP

WebCode: QUI0146

## QuickBooks Plus 2007/08

Timesaving features and powerful functionality make this a must-have for efficiency-minded businesses. It's designed for businesses that track payroll.

- Integrated payroll management
- Track inventory
- Process credit card payments
- Import bank statements
- Track GST & BAS
- Keep track of your business with over 100 reports and graphs
- Compatible with Microsoft Windows 2000/XP/Vista
- 12 months free technical phone support and upgrades

**Upgrade** (QUI0131) **$330**
**Subscription** (QUI0134) **$240**




Brought to you by Reckon

***BONUS** upgrade to QuickBooks 2008/09 upon release

Offer ends 16th March 2008, *See www.csw.com.au/promotions

You Pay $521

**$371**

*After $150 Cashback

SAVE $208 off RRP

WebCode: QUI0128

## QuickBooks Pro 2007/08

Tracks stock and comes with advanced tools to help increase efficiency and accuracy. Including all the basic accounting functionality of QuickBooks Plus, it adds advanced productivity tools such as integration to the MS Office suite and MS Outlook.

- Time billing & job costing
- Integration with Microsoft Office
- Integrated payroll management
- Track inventory
- Process credit card payments
- Keep track your business with over 100 reports & graphs
- Compatible with Microsoft Windows 2000/XP/Vista
- 12 months free technical phone support & upgrades

**Upgrade** (QUI0132) **$485**
**Subscription** (QUI0135) **$298**




Brought to you by Reckon

***BONUS** upgrade to QuickBooks 2008/09 upon release

Offer ends 16th March 2008, *See www.csw.com.au/promotions

You Pay $748

**$548**

*After $200 Cashback

SAVE $301 off RRP

WebCode: QUI0129

## QuickBooks Premier 2007/08

Industry-specific edition incorporates comprehensive tools to meet your specialised needs, with multi-user capability.

- Up to 3 simultaneous users (upgradeable to 5)
- Industry specific edition
- Time billing & job costing
- Integration with Microsoft Office
- Process credit card payments
- Integrated payroll management
- Track inventory
- Keep track of your business with over 100 reports and graphs
- Compatible with Microsoft Windows 2000/XP/Vista
- 12 months free technical phone support and upgrades

**Upgrade** (QUI0133) **$730**
**Subscription** (QUI0134) **$240**




Brought to you by Reckon

***BONUS** upgrade to QuickBooks 2008/09 upon release

Offer ends 16th March 2008, *See www.csw.com.au/promotions

You Pay $1210

**$810**

*After $400 Cashback

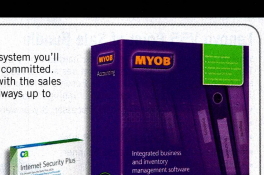
SAVE $589 off RRP

WebCode: QUI0130

## MYOB Accounting 17

With MYOB Accounting's inventory management system you'll know what's in stock, what's on order and what's committed. The inventory management system is integrated with the sales and purchases features, so your stock listing is always up to date and accurate.

**Upgrade** (MYB0078) **$228**




*BONUS
CA Internet Security 2008 - Single User

MYOB

Offer ends 14th March 2008, *See www.csw.com.au/promotions

**$287** | SAVE $62 off RRP | WebCode: MYB0074

## MYOB BusinessBasics

Manage all your basic business tasks from the one easy program, designed specifically for small or home-based Australian businesses. Streamline the data entry and reconciliation side of managing your business with MYOB BusinessBasics, and free up your time to focus on running it. MYOB Business Basics is ideal if you:

- Run a small or home based business
- Employ no staff
- Have no inventory




MYOB

**$128** | SAVE $21 off RRP | WebCode: MYB0004

## MYOB Accounting Plus 17

**MYOB Accounting Plus helps you manage your business and your payroll with ease.**

It has the same business management features as MYOB Accounting Plus, it also

- Automates your Pay Runs
- Calculates PAYG withholdings
- Works out your superannuation and then updates all your accounts automatically

**Upgrade** (MYB0079) **$299**




*BONUS
CA Internet Security 2008 - Single User

MYOB

Offer ends 14th March 2008, *See www.csw.com.au/promotions

**$478** | SAVE $117 off RRP | WebCode: MYB0075

## MYOB AccountEdge 7 - Mac

Manage both your business and payroll with ease using MYOB AccountEdge. It's packed with business and inventory management features to help you better manage your customer and supplier relationships.




*BONUS Microsoft Desktop 1000 Elite Keyboard & Mouse
Offer ends 14th March 2008
*See www.csw.com.au/promotions

MYOB

**$523** | SAVE $72 off RRP | WebCode: MYB0080

## MYOB Premier 11

MYOB Premier gives you the power to manage even the most complex medium-sized business.
Get the complete set of business management features as found in MYOB Accounting Plus and also handle transactions and accounts in multiple currencies.
Multiple people can access your business information at the same time, which can help make your processing more efficient. For example, someone can enter a sale while someone else prints a report or enters a cheque - think of the time you'll save!




*BONUS
- CA Internet Security 2008 - 3 User
- Belkin F9G820au2M-GRY - Gold Series 8-Way Surge Protector

MYOB

Offer ends 14th March 2008, *See www.csw.com.au/promotions

**$1346** | SAVE $149 off RRP | WebCode: MYB0077

## MYOB Accounting Plus 17 with Cover

Combine the features of Accounting Plus with MYOB Cover Support. MYOB Cover is a comprehensive support subscription that gives you the software, support and services to keep your business operating efficiently and profitably.




*BONUS CA Internet Security 2008 - Single User

MYOB

Offer ends 14th March 2008
*See www.csw.com.au/promotions

**$738** | SAVE $111 off RRP | WebCode: MYB0076

# Point of Sale & CAD Software

## MYOB RetailReady

MYOB RetailReady contains all the software and hardware you need to turn your PC into an effective Point of Sale (POS) solution. RetailReady processes sales fast, reports GST and performs "Cash Ups" in just a few clicks.




Includes MYOB Retail Basics, Barcode Scanner, Thermal Docket Printer and Electronic Cash Drawer

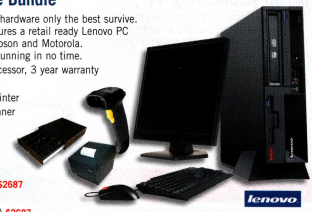
**$872** SAVE $127 off RRP
WebCode: MYB0040

## Lenovo V55 Point of Sale Bundle

When it comes to retail POS computer hardware only the best survive. This Lenovo POS hardware bundle features a retail ready Lenovo PC and peripherals from brands such as Epson and Motorola. Just add your software and be up and running in no time.

- Lenovo V55e PC – Core Duo 1.6 Processor, 3 year warranty
- 17" LCD Monitor
- Epson TM-T88IV Thermal Receipt Printer
- Motorola LS2208 USB Barcode Scanner
- Cash Drawer
- Keyboard and Mouse
- Windows XP Pro
- Serial interface

**Serial & Touch Screen Kit** (LNV1001) $2687
**Parallel Kit** (LNV1002) $2023
**Parallel & Touch Screen Kit** (LNV1003) $2687
**USB Kit** (LNV1004) $2086
**USB & Touch Screen Kit** (LNV1005) $2752




**$2023** SAVE $122 off RRP
WebCode: LNV1000

## MYOB RetailHospitality (RetailManager Included)

Designed specifically for restaurants, bars, cafe's and food outlets, this easy to use table management and Point of Sale application works with MYOB RetailManager's business reporting tools. RetailHospitality allows you to manage sections of your outlet from one or a few networked locations.



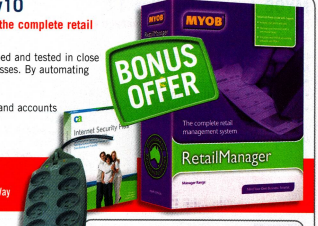

**$2266** SAVE $333 off RRP
WebCode: MYB0083

## MYOB RetailManager v10

**Welcome to MYOB RetailManager, the complete retail management system.**

Our retail software is designed, developed and tested in close collaboration with existing retail businesses. By automating many of your key store procedures and processes.

- Process sales fast, including lay-bys and accounts
- Manage your inventory
- Identify where you're making money
- Comprehensively manage pricing




*BONUS
- CA Internet Security 2008 - Single User
- Belkin F9G820au2M-GRY - Gold Series 8-Way Surge Protector

Offer ends 14th March 2008
*See www.csw.com.au/promotions

**$1695** SAVE $295 off RRP
WebCode: MYB0082

## Quicken Retail Point of Sale 2007/08

Retail Point of Sale is retail intelligence at your fingertips, including the features you need to track all of your sales, inventory, purchase orders, customers and accounting. Retail Point of Sale has had years of experience in this industry and comes to you with a wealth of 'functionality'.




*BONUS
Upgrade to Retail Point of Sale 2008/09

*See www.csw.com.au/promotions for terms and conditions.

**$444** SAVE $55 off RRP
WebCode: QUI0138

## Quicken Retail Starter Kit 07/08

If you are opening your store for the first time, or upgrading from a cash register, then Quicken's Retail Starter Kit is what you need. The Retail Starter Kit has been designed to make getting started easy.

- Point of sale and back office management
- Integrated EFTPOS
- Touch Screen enabled
- Customer management tools
- Inventory management
- Compatible with MS Win 2000/XP/Vista
- 12 months free technical phone support & upgrades




- QuickBooks Plus 2007/08
- Retail Point of Sale 2007/08
- Thermal Printer, Scanner & Cash Drawer

Reckon

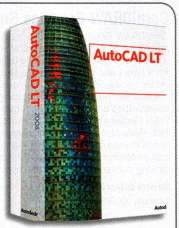
**$882** SAVE $117 off RRP
WebCode: QUI0137

## Autodesk AutoCAD LT 2008

Streamline your day-to-day tasks with AutoCAD LT 2008 software, the world's number-one-selling 2D drafting and detailing product. Daily work is simpler thanks to tools built with the drafter in mind. Work smarter and minimize workarounds as you refine your precision with annotation scaling and layer properties per viewport, text and table enhancements, and multiple leaders.

**The recommended system requirements as follows:**

- Intel Pentium 4, 2.2 GHz Recommended
- Microsoft Windows Vista Home Basic, Home Premium, Ultimate, Business and Enterprise, Windows XP Home & Professional (SP2), Windows 2000 (SP4)
- 512 MB RAM
- 550 MB free disk space for installation
- 1024x768 VGA with True Color
- Microsoft Internet Explorer 6.0 (SP1 or higher)




**Upgrade** (AUT0164) **$814**

Autodesk

**$1984** | **SAVE $216 off RRP** | WebCode: AUT0163

## Autodesk AutoCAD 2008

Meticulously refined with the designer in mind, AutoCAD 2008 propels day-to-day drafting forward with features that increase speed and accuracy while saving time. Annotation scaling and layer properties per viewport minimize workarounds, while text and table enhancements and multiple leaders help deliver an unmatched level of aesthetic precision and professionalism.




Autodesk

**$6767** | **SAVE $273 off RRP** | WebCode: AUT0165

## Autodesk AutoSketch 9

AutoSketch software provides a complete set of CAD tools for creating professional-quality precision drawings. A series of tutorials get you up and running fast. A Microsoft Windows XP, like interface provides a familiar environment for straightforward drafting.




Autodesk

**$262** | **SAVE $13 off RRP** | WebCode: AUT0077

## Autodesk AutoCAD Revit Architecture Suite 2008 Student

With the Autodesk Revit parametric building modeller, you don't have to deal with tedious documentation coordination because the software does it for you.

**14 month license - students course record enrolment confirmation required on purchase**




***BONUS 2 Hoyts Movie Tickets Via redemption offer expires 31st March**

See csw.com.au/promotions for Terms and Conditions

**$154** | **SAVE $11 off RRP** | WebCode: AUT0180

## Autodesk Inventor 2008 Student

Autodesk Inventor offers improved workflow functionality and surface-solids modelling tools, increased support for DWF files including password support and print ready format, and key enhancements.

**14 month license - students course record enrolment confirmation required on purchase**




***BONUS 2 Hoyts Movie Tickets Via redemption offer expires 31st March**

See csw.com.au/promotions for Terms and Conditions

**$154** | **SAVE $11 off RRP** | WebCode: AUT0181

## Autodesk

### Autodesk Subscription

**Simplify your technology upgrades and boost your design productivity with the complete software, support, and training package from Autodesk Subscription.**

Autodesk Subscription is a maintenance program giving you access to Autodesk's latest software releases and enhancements that keep your design tools up-to-date and make the most of your software investment. With software extensions, downloadable e-courses, a single contract number to manage your software, and the option of Autodesk Direct Online Support, you can simplify your software upgrades and minimize disruptions to your workflow.

Get up to date and up to speed now with Autodesk Subscription. All this for a single annual fee when you buy AutoCAD 2008




## IMSI TurboCAD Deluxe 14

Revolutionise the way you design with TurboCAD Deluxe's advanced CAD tools. Create precision 2D drawings, intricate 3D models and utilise powerful photorealistic rendering tools to accurately visualise and present your projects. It is packed with hundreds of advanced design tools typically found in programs costing hundreds or even thousands, but is simple enough for anyone.




**BONUS**
2D Training CD

**$178** | **SAVE $21 off RRP** | WebCode: IMS0038

## QuarkXPress 7

**Fast. Simple. Robust. It's the industry standard**

More people use QuarkXPress for creative design and page layout than any other software in the world. Period. Millions of users are now discovering the power of the new QuarkXPress 7, the most important QuarkXPress upgrade ever.



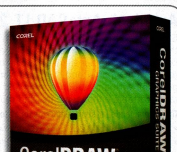
**FREE**
Quark Interactive Designer and Quark XPert Tools Pro included

**$1375** SAVE $124 off RRP
WebCode: QUA0040

## CorelDRAW Graphics Suite X4

CorelDRAW Graphics Suite X4 lets you tackle creative graphics and design projects with confidence. New tools make it easier and quicker than ever to deliver any creative project, from layout and photo editing, to illustration and bitmap-to-vector tracing. Powerful text and layout enhancements give you the look you want plus market-leading file compatibility makes collaboration easy. Updated high-quality content, a step-by-step Hints Docker and new tutorials written by experts get you started fast. Professional and aspiring designers along with anyone who needs to express creative ideas will be able to turn their ideas into professional results: from distinctive logos and signs, to striking marketing materials and eye-catching web graphics.

**Student & Teacher** (COR8972) **$132**
**Upgrade** (COR8971) **$254**




NEW

**$620** SAVE $205 off RRP
WebCode: COR8968

## Apple iLife 08

iLife '08, a major update to Apple's award-winning suite of digital lifestyle applications, delivers significant upgrades to iPhoto, iWeb, GarageBand and iDVD, plus a completely reinvented iMovie that offers a revolutionary new way to enjoy, edit and share your video.

**Family Pack**
(APP0324) **$126**




Authorised Reseller

**$92** SAVE $7 off RRP
WebCode: APP0323

## Corel Paint Shop Pro Photo X2 for Windows

**The easiest way to get professional-looking photos - fast!**

New Corel Paint Shop Pro Photo X2 is the ideal choice for any aspiring photographer's digital darkroom. It's filled with everything from easy automatic photo fixes to precision editing tools. It even includes a built-in Learning Center to help new users get started right away!

**Upgrade** (COR9001) **$81**



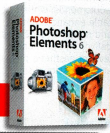

**$129** SAVE $70 off RRP
WebCode: COR9000

## Adobe Photoshop Elements 6.0 Academic

**Make your photos look their best**

Create amazing composites with easy-to-use tools Brush away wrinkles, unwanted objects, and other flaws. Make selections in a snap so you can easily adjust specific areas of a photo. Easily adjust skin tones for a more natural look.

**Full** (ALD9599) **$137**




*BONUS Training CD!
Offer ends 28 February 2008

*Refer to csw.com.au/promotions

**$93** SAVE $15 off RRP
WebCode: AEP9532

## Punch! Home Design Studio

We've taken our bestselling, benchmark home design technology and developed it to the next level - for Macintosh users!

- Intuitive interface and simple tools for quick learning curve.
- Cutting-edge technology creates breathtaking 3D views with controllable sun angle and shadows.
- Unique PowerTools allow design and editing from within the program.



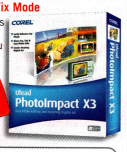

**$170** SAVE $29 off RRP
WebCode: PUN0020

## Corel PhotoImpact X3

Ulead PhotoImpact X3 combines full-featured photo editing with inspiring photo projects and amazing digital art to make digital photography and image creativity fun, fast and easy.

**Easy & Fast Express Fix Mode**

Automated enhancements and easy-to-understand options put the tools you need at your fingertips!



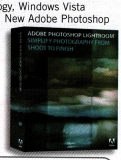

NEW

**$105** SAVE $15 off RRP
WebCode: ULE0118

## Adobe Photoshop Lightroom Academic

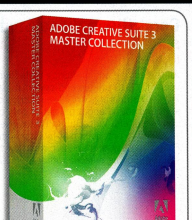
Includes flexible image management for multi-computer workflows, improved noise reduction and sharpening technology, Windows Vista compatibility, and more. New Adobe Photoshop Lightroom software is the professional photographer's essential toolbox.

**Full** (ALD0053) **$400**




**$138** SAVE $21 off RRP
WebCode: AEP0028

## Adobe Creative Suite 3 Master Collection Student Edition - Windows




Adobe Creative Suite 3 Master Collection combines full new versions of:

- InDesign CS3
- Illustrator CS3
- Dreamweaver CS3
- Fireworks CS3
- Premiere Pro CS3
- Encore CS3
- Photoshop CS3 Extended
- Flash CS3 Professional
- Contribute CS3
- After Effects CS3 Professional
- Soundbooth CS3
- Acrobat 8 Professional

**Full - Win** (ALD0073) **$3475**
**Academic - Win** (AEP0042) **$1296**
**Upgrade - Win** (ALG1036) **$1999**
**Mac versions also available.**

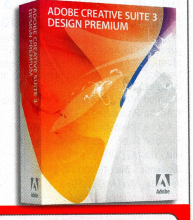
Adobe

***BONUS** Workshop DVD + CS3 Training Book!
Offer expires 30th April 2008 limited for student edition.

Via redemption. See csw.com.au/promotions for full Terms & Conditions.

**$697** | **SAVE $52 off RRP** | WebCode: ADS0011

## Adobe Creative Suite 3 Design Premium Student Edition - Windows




Let your ideas take flight with Adobe Creative Suite 3 Design Premium, which equips you to craft your best creative work more easily and efficiently than ever before. From thinking through concepts to finessing production details, you can leverage the intuitive tools in Creative Suite 3 Design Premium to make even your most visionary ideas real.

- InDesign CS3
- Illustrator CS3
- Dreamweaver CS3
- Photoshop CS3 Extended
- Flash CS3 Professional
- Acrobat 8 Professional

**Full - Win** (ALD0069) **$2648**
**Academic - Win** (AEP0037) **$819**
**Upgrade - Win** (ALG1027) **$849**
**Mac versions also available.**

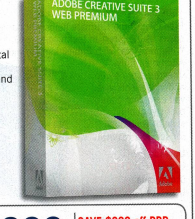
Adobe

***BONUS** Workshop DVD + CS3 Training Book!
Offer expires 30th April 2008 limited for student edition.

Via redemption. See csw.com.au/promotions for full Terms & Conditions.

**$419** | **SAVE $29 off RRP** | WebCode: ADS0007

## Adobe Creative Suite 3 Web Premium Academic - Windows




Adobe Creative Suite 3 Web Premium software is a complete solution for creating interactive websites, applications, user interfaces, presentations, mobile device content, and other digital experiences. Get everything you need to prototype your project, design assets, build web experiences, and efficiently maintain and update content.

- Dreamweaver CS3
- Photoshop CS3 Extended
- Fireworks CS3
- Contribute CS3
- Flash CS3 Professional
- Illustrator CS3
- Acrobat 8 Professional

**Upgrade - Win** (ALG1043) **$711**
**Full - Win** (ALD0077) **$2385**
**Mac versions also available.**

Adobe

**$666** | **SAVE $333 off RRP** | WebCode: AEP0046

## Adobe Creative Suite 3 Design Standard Student - Win




- Acrobat 8 Professional
- InDesign CS3
- Photoshop CS3
- Illustrator CS3

**Full - Win**
(ALD0071) **$1694**
**Academic - Win**
(AEP0039) **$529**
**Upgrade - Win**
(ALG1031) **$589**

Adobe

***BONUS** Workshop DVD + CS3 Training Book!
Offer expires 30th April 2008 limited for student edition.

**$280** | **SAVE $19 off RRP** | WebCode: ADS009

## Adobe Creative Suite 3 Web Standard Student - Win




- Dreamweaver CS3
- Flash CS3 Professional
- Fireworks CS3
- Contribute CS3

**Full - Win**
(ALD0079) **$1486**
**Academic - Win**
(AEP0048) **$539**
**Upgrade - Win**
(ALG1047) **$552**

Adobe

***BONUS** Workshop DVD + CS3 Training Book!
Offer expires 30th April 2008 limited for student edition.

**$282** | **SAVE $17 off RRP** | WebCode: ADS0015

## Adobe Photoshop Extended CS3 Student - Win

Adobe Photoshop CS3 Extended software delivers everything in Photoshop CS3 and more.




**Full - Win**
(ALD0095) **$1398**
**Academic - Win**
(AEP0064) **$379**
**Upgrade - Win**
(ALG1069) **$497**

Adobe

***BONUS** Workshop DVD + CS3 Training Book!
Offer expires 30th April 2008 limited for student edition.

**$216** | **SAVE $13 off RRP** | WebCode: ADS0017

## CyberLink DVD Suite 5 Pro

Includes PowerDirector Express, PowerDVD Express, PowerProducer, Power2Go, PowerBackup, MediaShow, PowerDVD Copy, InstantBurn, LabelPrint, and PowerStarter.

- Automatically fix and edit videos, animate photos
- Play DVD movies, video and music files
- Burn data files, rip music CDs and designs labels
- BD & HD-DVD support




**BONUS**
**$75 Cashback**
See www.csw.com.au/promotions (Offer Ends 29th Feb 2008)

**$131** SAVE $333 off RRP
WebCode: CYB0030

## Corel Ulead Video Studio 11.5 Plus

**Easy & Powerful Video Editing + DVD Authoring**

**Imagine the Movies You'll Make**

All the editing and authoring tools found in the standard version, PLUS unique and powerful features including full HD DVD authoring, AVCHD support, Dolby Digital 5.1 surround sound and a full set of easy corrective and creative filters. VideoStudio Editor gives you all the tools you need to produce great-looking home movies. Follow an easy, step-by-step workflow that lets you spend your time being creative rather than learning technical editing.




COREL

**$173** SAVE $26 off RRP
WebCode: ULE0117

## Apple Final Cut Studio 2 Upgrade

Authorised Reseller

Final Cut Studio 2 helps take you beyond mere editing. Discover the intuitive power of new creative tools designed expressly for Final Cut Pro editors. Rapidly move through editing to motion graphics, audio editing and mixing, color grading, and delivery - all as a natural extension of the work you already do.

**Full** (APP0288) **$1595**




**$605** SAVE $44 off RRP
WebCode: APP0289

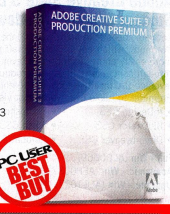
## Adobe Creative Suite 3 Production Premium Student Edition for Windows

Adobe Creative Suite 3 Production Premium software, the successor to Adobe Production Studio, enables exceptional productivity as you create visually innovative work for film, broadcast, web, mobile phones, and other portable devices.

**Includes:**

- Adobe After Effects CS3 Professional
- Adobe Illustrator CS3
- Adobe Premiere Pro CS3
- Adobe Soundbooth CS3
- Adobe Photoshop CS3 Extended
- Adobe Encore CS3
- Adobe Flash CS3 Professional

**Full - Win** (ALD0075) **$2488**
**Academic - Win** (AEP0044) **$848**
**Upgrade - Win** (ALG1039) **$1160**
**Mac versions also available.**




***BONUS** Workshop DVD + CS3 Training Book!
**Offer expires 30th April 2008**
Via redemption. See csw.com.au/promotions for full Terms & Conditions.

**$422** SAVE $27 off RRP
WebCode: ADS0013

| Software | WebCode | Price |
|---|---|---|
| Adobe Premiere Pro CS3 Full | ALD0065 | $1128 |
| Adobe Premiere Pro CS3 Upgrade | ALG1023 | $461 |
| Apple iLife 08 | APP0323 | $92 |
| Blaze DVD Copy 4 | BLA0001 | $64 |
| Blaze Video Magic 2 | BLA0005 | $33 |
| CyberLink PowerDirector 6 | CYB0032 | $143 |
| Pinnacle Studio 11 | PIN0160 | $128 |
| Pinnacle Studio Plus 11 | PIN0161 | $172 |
| Pinnacle Studio Plus 11 Upgrade | PIN0156 | $110 |
| Roxio Crunch for Windows & Macintosh | ROX5001 | $86 |
| Sony ACID Music Studio 7 | SON0069 | $138 |
| Sony Sound Forge Audio Studio 9 | SON0070 | $141 |
| Sony Super Duper Music Looper | SNY0030 | $77 |

## Pinnacle Studio Ultimate 11

**Your life in movies. Mastered.**

pinnacle

Pinnacle Studio Ultimate helps you harness the power of the latest in technology - HD, Windows Vista, Web Publishing and more. Additional fully-integrated pro audio and video tools give you complete control over the quality and style of your video for superior results.

**Upgrade** (PIN0175) **$132**
**Crossgrade** (PIN0177) **$191**



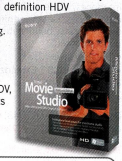

**$255** SAVE $44 off RRP
WebCode: PIN0159

## Sony Vegas Movie Studio Platinum Edition 8

With Sony Vegas Movie Studio Platinum Edition software you can import and edit video in nearly any format including high definition HDV and Sony AVCHD and integrated DVD authoring.

**Key features**

- 5.1 surround sound mixing and encoding
- Import and edit DV, HDV, and other video formats
- Gracenote MusicID CD album recognition




SONY

**$207** SAVE $32 off RRP
WebCode: SON0071

## Nero 8

Nero 8, the newest version of the world's best-selling multimedia suite, brings the digital world to your PC. Now it's easy to organise and manage all your multimedia files, as well as create and edit new digital content. Nero's sleek design and user-friendly tools make completing projects fun and enjoyable.

- Direct access to all features from the project launcher
- High Definition format support
- Xbox 360 and PlayStation 3 streaming features
- Blu-ray Disc and HD DVD burning support
- Copy a disc with just one click
- Graphics optimised for Windows Vista

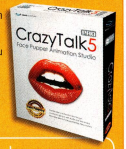



nero

**$154** SAVE $45 off RRP
WebCode: NER0028

## CrazyTalk5 PRO

CrazyTalk5 PRO interfaces facial animation with revolutionary real-time puppeteering controls empowering you with command performance over character facial expressions. The program provides the advanced functions and productivity with the most innovative and accessible features allowing you to command and control facial performances like never before.




REALLUSION

**$75** SAVE $10 off RRP
WebCode: REA0006

## Corel DVD Copy 6 Plus

Corel DVD Copy 6 makes copying DVDs and converting video easy. Enjoy full disc copying features. Convert video in three simple steps for sharing by email, on the Web, iPod, iPhone, PSP, Zune, mobile phone or portable media player. Easy, fast and reliable, DVD Copy 6 lets you take your video where you want to go.




COREL

**$71** SAVE $8 off RRP
WebCode: CRL0001

## Roxio Easy Media Creator 10

Express yourself digitally and capture, organise, edit, enhance, protect, share and enjoy all your photos, video and music. This all-in-one media suite offers the latest in media innovation - copy audio, movies and TV shows from any iPod to your PC. Burn to HD DVD and Blu-ray and much more!




roxio

**$139** SAVE $14 off RRP
WebCode: ROX5002

## Blaze Video Magic 2

**Convert your files for iPod, PSP, 3G smartphone, XviD and other hand held devices**

Make the most out of your portable devices! With Blaze Video Magic 2 you can make multimedia file conversions from a number of different formats to use on PCs, MP3 players, and portable MPEG4 devices.




**$33** SAVE $7 off RRP
WebCode: BLA0005

## Adobe Premiere Elements 4.0 Academic

Create and share great-looking movies in minutes with Adobe Premiere Elements 4, the newest version of the best-selling consumer video-editing software! Get started quickly with all your video clips and photos at your fingertips and easy options for turning them into polished movies. Show your style with amazing audio and video effects.

**Full** (ALD9601) **$137**




**$88** SAVE $31 off RRP
WebCode: AEP9534

## Adobe Photoshop Elements 6 & Premiere Elements

Adobe Photoshop Elements 6 & Adobe Premiere Elements 4 software combines two powerful yet easy-to-use products to deliver the most complete photo and video-editing solution.

**Academic** (AEP9533) **$132**




*BONUS $25 Village Cinemas Gift Card

*Offer valid to the first 40 purchases.For full Terms & Conditions see cpw.com.au/promotions.

**$198** SAVE $51 off RRP
WebCode: ALD9600



## Adobe Acrobat 8 Academic

Adobe Acrobat 8 Standard software enables business professionals to reliably create, combine, and control Adobe PDF documents for easy, more secure distribution and collaboration.

**Full**
(ALD9595) **$399**

**Upgrade**
(ALG9520) **$134**




**$123** SAVE $16 off RRP
WebCode: AEP9525

## Adobe Acrobat 8 Professional Academic

**Communicate and collaborate with the essential PDF solution**

Adobe Acrobat 8 Professional software enables business professionals to reliably create, combine, and control Adobe PDF documents for easy, more secure distribution, collaboration, and data collection.

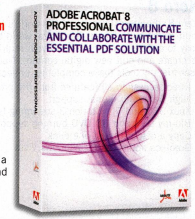
**Create**

Easily create Adobe PDF documents from Microsoft Office, Outlook, Internet Explorer, Project, Visio, Access, Publisher, AutoCAD, Lotus Notes, or any application that prints.

**Combine**

Combine documents, drawings, and rich media content into a single, polished Adobe PDF document. Optimise file size, and arrange files in any order regardless of file type, dimensions, or orientation.

**Professional - Win** (ALD9592) **$589**
**Upgrade - Win** (ALG9517) **$211**
**Mac versions also available.**




**$205** SAVE $20 off RRP
WebCode: AEP9523

## Adobe Licensing Programs

**Purchasing under Adobe's licensing programs is your best option when you require multiple copies of Adobe Software.**

**Key Benefits are:**

- Lower software costs.
- Reduced ordering and license administration, simplifying total software management efforts and streamlining internal business processes.
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- With Upgrade Plan option, technology consistency across the user base and deployment of the most current technology.
- Greater ability to manage legal compliance

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## ACT! by Sage 2008 v10 Academic

Celebrate the 20th Anniversary of the world's best selling contact and customer manager with the release of ACT! by Sage 2008.

- New interactive dashboard
- Compatibility with Office 2007 and Vista
- Direct integration with Outlook e-mail

**Upgrade** (TCA0114) **$148**
**Full** (TCA0113) **$242**




**$178** SAVE $31 off RRP
WebCode: TCA0115

## Nitro PDF Express V5

- Create PDFs from 300+ file types.
- Convert PDFs to Microsoft Word.
- Combine multiple files in different formats to a single PDF.
- Extract, shuffle and split pages from PDF files.
- Create secure PDF files.
- Process PDF files in batch.
- Easy-to-use task-based wizard interface.

**Professional**
(NIT0004) **$158**




**$84** SAVE $15 off RRP
WebCode: NIT0003

## Microsoft Office Project Standard 2007 Academic

Microsoft Office Project Standard 2007 gives you robust project management tools with the right blend of usability, power, and flexibility, so you can manage projects more efficiently and effectively.

**Upgrade** (MSA6143) **$536**
**Full** (MSA6142) **$913**




**Microsoft**

**$99** SAVE $14 off RRP
WebCode: MSA6141

## Microsoft Office Visio Professional 2007 Academic

Office Visio Professional 2007 is helping IT and business professionals world-wide visualise, analyse, and communicate complex information, systems and processes.

**Upgrade**
(MSA6150) **$537**
**Full** (MSA6149) **$853**



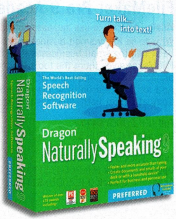

**Microsoft**

**$245** SAVE $30 off RRP
WebCode: MSA6148

## Nuance Dragon NaturallySpeaking 9 Preferred

Dragon NaturallySpeaking Preferred 9 gives small business users and PC enthusiasts the power to create documents, reports, emails and more—all by speaking! Fast, easy and amazingly accurate, it's over three times faster than typing. Just use your voice to dictate and edit in Microsoft Word and Excel, Corel WordPerfect, and virtually all Windows-based applications. You can even dictate into a handheld device when you're away from your PC, or use a Bluetooth microphone! It's never been easier to use—no script reading required, so you can get started right away!

**Academic** (NUAO018) **$275**




NUANCE

**$321** SAVE $78 off RRP
WebCode: NUA0017

## Nuance Dragon NaturallySpeaking 9 Preferred Mobile with Phillips Recorder for Windows

Dragon Naturally Speaking Preferred Mobile 9 gives small business users and PC enthusiasts the power to create documents, reports, e-mails and more.



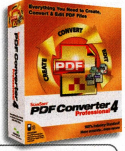

NUANCE

**$575** SAVE $75 off RRP
WebCode: NUA0016

## Nuance PDF Converter Professional 4

PDF Converter Professional 4 is the complete PDF solution for business users, offering an unmatched combination of creation, editing and conversion features. Renowned security and markup capabilities make PDF document collaboration and control easier than ever before.

**Academic**
(NUA0027) **$144**



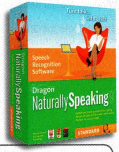

NUANCE

**$155** SAVE $40 off RRP
WebCode: NUA0025

## Nuance Dragon NaturallySpeaking 9 Standard

Dragon NaturallySpeaking Standard 9 is an easy-to-use product that gives you everything you need to get started, including a free high-quality headset microphone with noise cancelling technology.

**Academic**
(NUA0021) **$95**

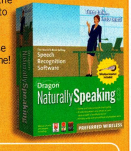



NUANCE

**$165** SAVE $34 off RRP
WebCode: NUA0019

## Nuance Dragon NaturallySpeaking 9 Preferred Wireless for Windows

Dragon Naturally Speaking Preferred Wireless gives you the ability to dictate into a handheld device when you're away from your PC, or use a Bluetooth microphone! Wireless headset included.



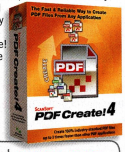

NUANCE

**$566** SAVE $34 off RRP
WebCode: NUA0055

## Nuance PDF Create! 4

ScanSoft PDF Create! is the fast, reliable and affordable way to turn all of your PC documents, drawings and images into industry-standard PDF files. Instantly create PDF documents that are compact and easy to email, can be universally viewed on the Web and that print just as if they came from the original application. PDF Create! also gives you all of the advanced features you need.

**Academic**
(NUA0033) **$49**




NUANCE

**$58** SAVE $11 off RRP
WebCode: NUA0032

## Nuance OmniPage 16

OmniPage 16 saves time and money by eliminating retyping. Instantly turn paper, digital camera photos, PDF and XPS files into editable electronic documents that look just like the original – complete with text, tables and graphics. OmniPage uses 99% + character accuracy to precisely format your documents so you can easily make changes.

**Academic**
(NUA0051) **$140**




NUANCE

**$159** SAVE $40 off RRP
WebCode: NUA0048

NUANCE

## Nuance Volume Licensing

The Nuance Volume License Program (VLP) is a program that enables customers to license software for use, rather than purchase 'boxed' products per user. This reduces product costs by eliminating unnecessary media, documentation, packaging, warehousing, and shipping.

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## FileMaker Pro 9 Advanced Academic

FileMaker Pro 9 Advanced includes all the features of FileMaker Pro 9 plus a suite of advanced development and customisation tools to help you design and develop more powerful, more customised database solutions – faster and easier than ever before!

**Upgrade** (FIL2007) **$473**
**Full** (FIL2006) **$756**




**$479** | SAVE $45 off RRP | WebCode: FIL2008

## FileMaker Pro 9 Academic

**Finally, an easy-to-use database software for Small Businesses!**

Why do so many small businesses choose FileMaker? FileMaker has been helping small businesses dream BIG for more than 20 years. FileMaker gives them the tools they need to easily manage people, projects, assets, and more! It's the #1-selling easy-to-use database. And for good reason, it works as hard as they do! Compatible for both Windows and Mac operating systems.

**Full** (FIL2000) **$477**
**Upgrade** (FIL2001) **$288**

**Full 5-pack** (FIL2003) **$1914**
**Upgrade 5-pack** (FIL2004) **$1134**
**Academic 5-pack** (FIL2005) **$1182**




FileMaker.

**$294** | SAVE $5 off RRP | WebCode: FIL2002

## FileMaker Server 9 Upgrade Academic

Simply install FileMaker Server software on a dedicated computer and upload your FileMaker Pro databases to the server. You and your team will instantly realize how fast and easy it is to access your databases 24/7.

**Upgrade** (FIL2010) **$939**
**Full** (FIL2009) **$1578**




**$977** | SAVE $13 off RRP | WebCode: FIL2011

## Microsoft Visual Studio 2008 Pro Edition with MSDN Premium

Developers using Visual Studio 2008 Professional Edition can target the Microsoft Office system, Windows Mobile devices, and SQL Server. Visual Studio Tools for Office is now a fully integrated part of Visual Studio 2008 Professional Edition.




Microsoft

**$3925** | SAVE $430 off RRP | WebCode: MSA9906

## Microsoft Visual Studio 2008 Professional with MSDN Pro

MSDN Subscriptions are the ultimate resource for professional Developers, teams, and organisations engaged in application development. Comprehensive access to Microsoft tools and technologies enable teams to confidently design, develop and test software solutions; professional support services and expert information resources ensure Developers can rise to the biggest challenges.




Microsoft

**$1879** | SAVE $205 off RRP | WebCode: MSA9904

FileMaker.

## Annual Volume License Agreement (AVLA)

**Who should purchase this type of license?**
**Organisations that need at least 10 licenses.**

**Benefits**

- Save over 13% off single user packages
- Includes 12 months maintenance
- No minimums for adding seats to an existing AVLA

**For more information**
**Contact CSW-IT on 1300 761 761**
**or go to csw-it.com.au**

## Microsoft Expression Studio

Microsoft Expression Studio, a suite of tools for creative designers that gives you the freedom to bring your vision to reality and boosts developer collaboration in the delivery of rich user experiences for the Web, Windows Vista applications and beyond. Compatible with Windows and Mac.

**Key Benefits:**

- Expression Web
- Expression Blend
- Expression Design
- Expression Media

**Academic** (MSS0081) **$154**
**Upgrade** (MSS0083) **$543**




**$934** | SAVE $106 off RRP | WebCode: MSS0082

## Microsoft Expression Web

Build dynamic, interactive pages that harness the power of the Web to deliver superior quality. Built-in support for today's modern Web standards makes it easy to optimize your sites for accessibility and cross-browser compatibility.

**Key Benefits:**

- Standards-based Web Sites
- CSS Based Layout

**Academic** (MSA9880) **$91**
**Upgrade** (MSA9882) **$159**




Microsoft

**$467** | SAVE $56 off RRP | WebCode: MSA9881

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an SAP company

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**Upgrade** (SCR2009) **$437**
**Full** (SCR2008) **$732**

## Case Study

FileMaker®

UTS Institute for Sustainable Futures gets the best of both worlds with FileMaker Pro and Excel

Since 2000, ISF had used a project management system based entirely in Excel but as the volume of work grew, it needed a cross-platform solution that allowed for good project planning and analysis but at the same time did not have a steep learning curve.

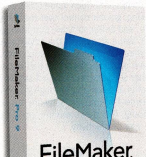
After trialling many off-the-shelf solutions, ISF selected Keysoft to create a solution based on FileMaker Pro that was flexible and simple to use but which provided detailed record keeping and reports.

ISF project managers were accustomed to planning on a spreadsheet, so Keysoft developed a solution that successfully integrates FileMaker Pro and Excel.

Most analysis is automated with data brought directly into Excel from FileMaker. Click on the 'Refresh' button and the latest project information is right there in the Excel spreadsheet! Now with the new Web Viewer feature in FileMaker Pro, these reports are also accessible from inside FileMaker.

"With FileMaker Pro the information at our fingertips is up to date, immediate and detailed, and if I need a new report, I simply make it myself. At the click of a button, I now have a project budget report focusing on budget over-runs and a staff utilisation report. These are the two main elements which affect whether we reach our financial targets. In the past, we either didn't have the information, or it was after the event. Now reports are available to all staff on our intranet and through Web Viewer in FileMaker.

Any Project Director can access them at any time and click a button to update it with the latest data in the database. The Keysoft system using FileMaker and Excel has saved us hours of work and we have reliable and detailed data - which was not the case with the old system," said Dallas Lewis, Institute Manager, ISF.




$477 SAVE $22 off RRP
WebCode: FIL2000

FAST Same Day Despatch* ECONOMICAL Express Delivery RELIABLE Knowledgeable staff

Microsoft CERTIFIED Partner

## Microsoft Volume Licensing

**Microsoft Volume Licensing for Small/Medium business (5-250 PCs)**

Microsoft Open License is a simple and flexible software volume licensing program designed for customers who order as few as five licenses. Open License benefits include:

- Significant discounts over full retail prices.
- Ability to obtain licenses through multiple locations from a worldwide reseller channel.
- Easier management of license portfolios with eOpen (electronic license management)

**Choose the Open License Program that's right for you**

The Microsoft Open License program offers you three great ways to save on Microsoft products:

**Microsoft Open Business**

Open Business is for companies looking to save money without a large up-front volume commitment. The initial order is five or more licenses for any combination of Microsoft products. You can place reorders for two full years and enjoy discounts (as compared to estimated retail prices for Full Packaged Product). There is no minimum reorder quantity.

**Microsoft Open Volume**

Open Volume is for companies looking to take advantage of volume discounts greater than those offered under Open Business who are in a position to place a minimum initial order of 500 points within a product pool - Applications, Systems, or Servers. Each license carries a unit value of at least one point; some licenses count for higher unit values. And, just as with Open Business, you qualify for the same discount as your initial order when you place additional orders as small as one license throughout the two-year term of your License Agreement.

**Microsoft Open Value**

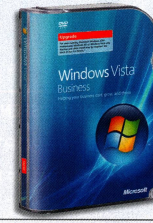
Microsoft Open Value is a premium volume licensing offer available under the Open License family. Designed for organisations with as few as five computers, Open Value offers simpler license tracking, greater control over the software upgrade cycle, and better software cost management. Open Value also offers the advantages of Software Assurance (SA), which includes new version upgrades, technical training, user training, partner services, and product support. These benefits are available through the term of the agreement to improve software resource planning, ROI measurement, and IT professional and user productivity.

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csw-it.com.au
1300 761 761

## Microsoft Windows Vista Business Upgrade

Windows Vista Business is the first edition of Windows designed specifically to meet the needs of small businesses. You'll spend less time on technology support–related issues so you can spend more time making your business successful. Windows Vista Business is the definitive choice for your business today and tomorrow.

- Instant Search helps you locate information on your PC even within e-mail.
- Windows Fax and Scan provides flexible, integrated faxing and scanning in one location on your PC
- Windows Aero user experience, which includes glass-like visuals, allows you to easily navigate open files and programs.




**Full** (MSA5106) **$515**

**$339** SAVE $39 off RRP
WebCode: MSA5107

## Microsoft Windows Vista Home Premium Academic Upgrade

Windows Vista Home Premium is the operating system for homes with advanced computer needs. It will help you use your laptop or desktop PC more effectively as well as enable you to enjoy new, exciting digital entertainment experiences all with the benefit of added security and reliability.




**Upgrade** (MSA5104) **$253**
**Full** (MSA5103) **$405**

**$161** SAVE $18 off RRP
WebCode: MSA5105

## Apple Mac OS X Leopard

Add a new Mac to your Mac. Mac OS X v10.5 Leopard is packed with over 300 new features, installs easily, and works with the software and accessories you already have.

Choose a single-user license for home or office. Or if you have more than one Mac at home, choose the five-user Family Pack.




**Family Pack**
(APP0349) **$236**

Authorised Reseller

**$148** SAVE $10 off RRP
WebCode: APP0350

## Microsoft Windows Vista Ultimate Upgrade

Windows Vista Ultimate is the most comprehensive edition of Windows Vista. It is the first operating system that combines all of the advanced infrastructure features of a business – focused operating system.




**Full** (MSA5108) **$673**

**$444** SAVE $51 off RRP
WebCode: MSA5109

## Parallels Desktop 3.0 for Mac

**The killer app for Mac is now even better than ever!**

Parallels Desktop for Mac enables you to run Windows, Linux, and more side-by-side with Mac OS X on any Intel-powered Mac, without rebooting. With Parallels' award-winning virtualisation technology, you can run Mac OS X and your favorite Windows applications at the same time. You can even drag-and-drop files between desktops!




parallels

**$97** SAVE $17 off RRP
WebCode: PAR0003

## Microsoft Office Professional 2007 Academic*

**Work more efficiently and effectively**

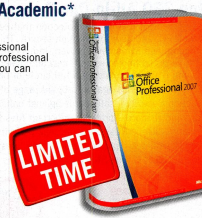
New tools help you work faster and create more professional documents, spreadsheets, and presentations. Office Professional 2007 helps you quickly accomplish routine tasks so you can spend more time with your customers.

**Applications included:**

- Word 2007
- Excel 2007
- PowerPoint 2007
- Publisher 2007
- Access 2007
- Outlook 2007 with Business Contact Manager

**Upgrade** (MSA6109) **$487**
**Full** (MSA6108) **$751**

*Also valid for home/non-commercial use



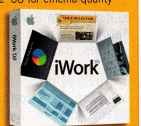

Microsoft Office

**$248** | SAVE $51 off RRP | WebCode: MSA6107

## Apple iWork 08 for Mac

Apple's amazing productivity suite for the Mac, iWork '08 includes three applications: Pages '08 for word processing with an incredible sense of style; Numbers '08 for powerful, compelling spreadsheets made easy; and Keynote '08 for cinema-quality presentations for everyone.

**Family Pack** (APP0326) **$121**




Authorised Reseller

**$92** | SAVE $7 off RRP | WebCode: APP0325

## Microsoft Office Home and Student 2007#

**Applications included:**

- Word 2007
- Excel 2007
- PowerPoint 2007
- OneNote 2007

*for non-commercial use only




Microsoft Office

**BONUS** $30 Cashback

Offer ends 29th February 2008, *See www.csw.com.au/promotions

You Pay $196
**$166** *After $30 Cashback | SAVE $63 off RRP | WebCode: MSA6101

## Microsoft Office 2008 for Mac Home and Student Edition

The perfect Office for families and students. Microsoft Office 2008 for Mac Home and Student Edition is more powerful and easier to use, helping you to achieve more and simplify your day, for less. New features, intuitive new look and compatibility with Office for Windows will unleash your productivity at a budget-friendly price.




**$198** | SAVE $31 off RRP | WebCode: MSA3770

## Microsoft Office 2008 for Mac Special Media Edition Upgrade

Office 2008 for Mac Special Media Edition is more powerful and easier to use, helping the media- savvy Mac user achieve more while simplifying the management of digital assets. Intuitive new look and compatibility with Office for Windows will unleash your productivity and creativity.

**Full** (MSA3771) **$592**




**$387** | SAVE $162 off RRP | WebCode: MSA3772

## Microsoft Office Standard 2007 Upgrade

**Applications included:**

- Word 2007
- Excel 2007
- PowerPoint 2007
- Outlook

**Full** (MSA6103) **$623**
**Academic** (MSA6102) **$259**




Microsoft Office

**BONUS** $50 Cashback

Offer ends 29th February 2008, *See www.csw.com.au/promotions

You Pay $365
**$315** *After $50 Cashback | SAVE $84 off RRP | WebCode: MSA6104

## Microsoft Office 2008 for Mac

Microsoft Office 2008 for Mac is more powerful and easier to use, helping you to achieve more and simplify your day. New features, intuitive new look, Universal support, and compatibility with Office for Windows will unleash your productivity.

- Word 2008
- Excel 2008
- Powerpoint 2008
- Entourage 2008
- Exchange Support

**Full** (MSA3773) **$494**




**$298** | SAVE $101 off RRP | WebCode: MSA3774

| Software | WebCode | Price |
|---|---|---|
| MS Access 2007 | MSA6116 | $352 |
| MS Excel 2007 | MSA6126 | $352 |
| MS Office Small Business 2007 | MSA6105 | $691 |
| MS Office Small Business 2007 Upg | MSA6106 | $437 |
| MS Office Ultimate 2007 | MSA6111 | $998 |
| MS Office Ultimate 2007 Upgrade | MSA6112 | $828 |
| MS Onenote 2007 | MSA6119 | $142 |
| MS Outlook 2007 | MSA6122 | $165 |
| MS Powerpoint 2007 | MSA6130 | $352 |
| MS Student with Encarta Prem 2008 | MSC2941 | $80 |
| MS Windows Vista Home Basic | MSA5102 | $342 |
| MS Windows Vista Home Basic Upg | MSA5101 | $165 |
| MS Word 2007 | MSA6145 | $352 |
| MS Works 9 | MSC2940 | $66 |

## Symantec Endpoint Protection (SEP)

**Symantec Endpoint Protection combines Symantec AntiVirus with advanced threat prevention to deliver an unmatched defense against malware for laptops, desktops, and servers.**

**It provides protection against even the most sophisticated attacks that evade traditional security measures, such as rootkits, zero-day attacks, and mutating spyware.**

**It provides a single agent that is administered by a single management console. This simplifies endpoint security administration and provides operational efficiencies such as single software updates and policy updates, unified and central reporting, and a single licensing and maintenance program.**

**To evaluate Symantec Endpoint Protection visit here http://www.symantec.com/ap/citysoftwaredownload**




CSW-IT
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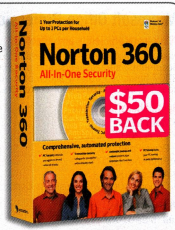
## Norton 360 All-In-One Security 3 User

Norton 360 provides all-in-one protection that keeps you, your family, your PC, and your information secure. This comprehensive solution combines Symantec's proven, industry-leading security and PC tune-up technologies with new automated backup and antiphishing features, providing a full circle of protection.

- PC Security – defends against a broad range of threats
- Transaction Security – safeguards against online identity theft
- Backup and Restore – protects important files from loss
- PC Tuneup – keeps PCs tuned for peak performance
- Automatic Updates – protects against the latest online threats
- Includes 2GB of Online Storage

**5 User** (SYM9745) **$162**

**10 User** (SYM9746) **$288**




PC User BEST BUY
Australian PC User, September 2007

symantec.

**$106** SAVE $19 off RRP
WebCode: SYM9740

## Norton Internet Security 2008 3 User

**Stay protected from the latest online threats.**

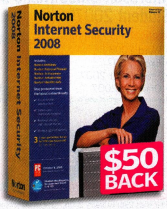
Norton Internet Security 2008 runs quietly in the background to detect and block today's complex threats and to protect your customers' identities when they buy, bank, or browse online. Includes

- Norton AntiVirus
- Norton Antispyware
- Norton Antiphishing
- Norton Personal Firewall
- Norton Identity Safe

Extend your protection with antispam and parental controls with the optional Norton Add-on Pack.
Get help fast with free technical support via embedded live chat and email.

**5 User** (SYM9770) **$124**

**10 User** (SYM9771) **$209**




PC MAGAZINE EDITORS' CHOICE
September 7, 2007
Norton Internet Security 2008

symantec.

**$88** SAVE $11 off RRP
WebCode: SYM9769

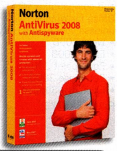
## Norton AntiVirus 2008 3 User

Norton Antivirus 2008 helps block viruses and spyware with advanced protection.
Norton AntiVirus 2008 helps protect your entire computer by preventing viruses, spyware and other security risks from harming your system.

**1 User** (SYM9760) **$44**

**5 User** (SYM9767) **$111**

**10 User** (SYM9768) **$165**

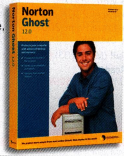



symantec.

**$77** SAVE $12 off RRP
WebCode: SYM9766

## Norton Ghost 12.0

Symantec's Norton Ghost 12.0 protects your computer with advanced backup and recovery. It includes the backup protection you expect, with powerful new features such as enhanced performance, available one-to-one remote management, LightsOut Restore capability, and more.




symantec.

**$69** SAVE $31 off RRP
WebCode: SYM9908

## Trend Micro Internet Security Pro 2008 3 User

BONUS OFFER

**Complete protection home and away**

Whether you are at home or on the go, Trend Micro Internet Security Pro safeguards your online transactions, identity, and irreplaceable files with the most comprehensive protection available. Get all the benefits of our proven Internet security plus enhanced identity theft protection, Wi-Fi validation, data theft protection, and system recovery.

- Includes Firewall, Antivirus & Spyware detection and removal
- New System Restore
- 3 User License




**BONUS** Turn your PC into a TV!
USB 2.0 Digital TV Receiver When you purchase... Trend Micro Internet Security Pro 2008

**$104** | SAVE $25 off RRP | WebCode: TRM0017

| Software | WebCode | Price |
|---|---|---|
| Acronis Disk Director Suite 10 | ACR1001 | $96 |
| Bullguard Backup | BUL0003 | $55 |
| CA Antivirus Plus Antispyware 2008 3 User | CHY2056 | $38 |
| CA Internet Security 3 User + 2GB Flash Drive | CAI0002 | $77 |
| McAfee Internet Security 2008 3 User Aca | MCF2186 | $61 |
| McAfee Total Protection 2008 3 User | MCF2184 | $101 |
| Net Nanny 5 Special Edition | NAN0001 | $43 |
| Norton Partion Magic 8 | SYM2560 | $95 |
| Norton Save & Restore | SYM9901 | $58 |
| Norton Systemworks Premier 10 User | SYM9725 | $280 |
| PC Tools Spyware Doctor 2007 | PCT0001 | $46 |
| Trend Micro Mobile Security 2008 | TRM0013 | $44 |
| Zone Alarm Internet Security 2008 | CHE0024 | $74 |
| Zone Alarm Internet Security 2008 3 User | CHE0026 | $83 |

## PC Tools Registry Mechanic 2007

Repair and optimise your registry in a few simple mouse clicks!

- Improve system stability and longevity
- Repair common causes of crashes and errors
- Maximize PC efficiency and performance




PC Tools Software

**$42** | SAVE $8 off RRP | WebCode: PCT0002

## Trend Micro Internet Security 2008 3 User

Trend Micro Internet Security 2008 makes it easy to protect your home network, personal identity, and online activities against viruses, spyware, identity theft and other present and future web threats. Confidently email, shop, bank, or share photos online, knowing your privacy and files are well protected.




**$79** | SAVE $20 off RRP | WebCode: TRM0015

## Microsoft Windows Live OneCare 2.0 3 User

Help get peace of mind knowing that everything is managed for your virus and spyware scanning, firewalls, tune-ups, file backups, the whole nine yards. And it's all delivered to you in a smooth, hassle free package.




**$74** | SAVE $25 off RRP | WebCode: MSA5110

## Acronis True Image 11 Home

**Powerful backup that is easy to do!**

A complete data protection suite – backup your entire PC, your data, and your OS and applications.

- Try and Decide: easy rollback of system changes.
- Smart Scheduling: start backup when user is idle, login/logout and other events.
- Protect your archives with password-based encryption.




**$68** | SAVE $11 off RRP | WebCode: MAN0102

## CA Internet Security Suite Plus 2008

**Comprehensive Internet Security and Data Protection**

- Key Features
- Anti-Virus
- Anti-Spyware
- Personal Firewall
- Anti-Spam
- Anti-Phishing
- Parental Controls
- Data Backup and Transfer




**BONUS** $60 cash back when purchased with hardware to the value of $100. Offer ends 31/3/2008.

*See www.csw.com.au/promotions

You Pay $69.95
**$9.95** After $60 Cashback | SAVE $60 off RRP | WebCode: CHY2057



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# ESSENTIALS FOR YOUR PC...!

## Microsoft Office 2007 Home & Student

Office Home and Student 2007 is the software suite that helps people easily create great looking documents, worksheets and presentations, as well as manage notes and information at home. It offers improved menus and tools, enhanced graphics and formatting capabilities, new time management tools, and greater reliability and security.

***Included***
- Word 2007
- Excel 2007
- PowerPoint 2007
- OneNote 2007




**$196** | **SAVE $33 off RRP**
WebCode: MSA6101

## Microsoft Windows Vista Home Premium Academic Upgrade

Windows Vista Home Premium is the preferred edition for home desktop and mobile PCs. It provides a breakthrough design that brings your world into sharper focus while delivering the productivity, entertainment, and security you need from your PC at home or on the go.

**Full**
(MSA5103) **$405**

**Full Upgrade**
(MSA5104) **$253**




**$161** | **SAVE $18 off RRP**
WebCode: MSA5105

## Microsoft Office 2007 Professional Academic

Office Professional 2007 is a complete, easy-to-use suite of productivity and information management software to help business professionals save time and stay organised. Powerful features centralise customer, sales and project information in one place so users can respond more quickly to opportunities.

**What's included in Office Pro 2007**
- Word
- Excel
- PowerPoint
- Access
- Publisher
- Outlook with Business Contact Manager.




**$275** | **SAVE $24 off RRP**
WebCode: MSA6107

## Microsoft LifeCam VX-3000

With Microsoft LifeCam VX-3000 and Windows Live Messenger and you can take instant messaging with friends and family to a new level of sight and sound.
- High Definition photos - Capture high-quality, still photos at 1.3 megapixel resolution.
- Built-in microphone - The built-in microphone automatically picks up your voice with remarkable clarity




**$79** | **SAVE $20 off RRP**
WebCode: MST8426

## Microsoft Wireless Optical Desktop 700

Get the reliability you expect from Microsoft hardware at an extraordinary value — with the Microsoft Wireless Optical Desktop 700. This keyboard and optical mouse combine the freedom of wireless with the control of an optical mouse with scroll wheel. Plus, it's easy to use — just plug in the receiver and start typing.



**$48** | **SAVE $11 off RRP**
WebCode: MST8249

## Microsoft Wireless Notebook Optical Mouse 3000

Go mobile with this portable ergonomic mouse. Easily enlarge and edit details with the new magnifier and scroll four ways with the innovative 4-way scrolling.




**$40** | **SAVE $9 off RRP**
WebCode: MST8420

Microsoft®

April 2008

# Adelong Computers

## Back Up Your Digital World

**2.5" Elements External Hard Drives**

- Ideal for the traveler
- USB Powered

160GB **$149.95**
250GB **$229.95**



**3.5" Elements External Hard Drives**

- 240V powered
- Home or Office Solution

250GB **$119.95**
320GB **$143.50**
400GB **$149.95**
500GB **$189.95**



## Digital Video Recorder / Player Case



Allows you to record directly from an analogue video/audio source such as a DVD player, VCR or security camera.

- Recording format: 720x576 @ 25FPS
- Included is a powerful time shift function allowing instant, delayed, timer or programmed recording.
- USB connect to computer to download recorded video, or upload media content
- Use as external hard drive for backup purposes
- Play uploaded images straight to your Hi-Fi system or television monitor
- Requires SATA hard drive see our website for full specs

CAGEM008 **$149.00**

## USB Audio/Video Grabber




- Convert your old VHS cassettes to DVD's
- Included software allows you to create DVD's and share with your family
- Bundled with Video Studio 7

CBCAB200 **$88**

## BenQ DVD-R 50pk

- 1x - 16x recording speeds
- Printable surface for use with deskjet printers




MMBEN113 **$ 17.95**

## Intel Quad Core Value System



With the latest technology in processors, the Intel Quad Core Value System is ideal for the medium to heavy home computer user. Dedicated graphics card will allow dual screen applications. The Logitech wireless keyboard and mouse provides extra freedom in your work space. Supplied with a quality 19" widescreen.

- **Windows Vista Home Premium Edition**
- Intel Quad-Core Q6600 (2.4GHz-8MB cache)
- 1G DDR2 667MHz Ram
- Gigabyte GA-P31-S3G Motherboard
- Sapphire Radeon X1550 256MB Graphics
- Seagate SATA II 160GB Hard Drive
- Great Wall 19" Widescreen LCD Monitor
- LG GSA-H55N DVD/CD Burner
- Logitech 660 Cordless Desktop
- Tsunami 321B Case (400W)
- Trend Micro Internet Security 2008

**$1299**

# SALES HOTLINE: 02 9260 3188

129 York Street, Sydney NSW 2000 Fax: 02 9267 5042 Email: sales@adelong.com.au

Although we take every reasonable precaution, due to the volume and diversity of the products that we carry, we do not accept liability for any errors in pricing or descriptions. Due to the nature of this catalogue, pricing and stock availability is subject to change at any time without notice.

# Adelong Computers

**Opening Hours:**
Monday 9:00am - 6:30pm
Tuesday 9:00am - 6:30pm
Wednesday 9:00am - 6:30pm

## 19" Widescreen



- Samsung panel — Model L9S0A
- Resolution: 1440x900 — **DVI + VGA**
- Response Time: 5ms
- Contrast Ratio: 800:1
- 3 Year Warranty

MOGRE003 **$249.00**

## 22" Widescreen



- Samsung panel — Model L22AZ4
- Resolution: 1680x1050 — **DVI + VGA**
- Response Time: 5ms
- Contrast Ratio: 1000:1
- 3 Year Warranty

MOGRE000 **$359.00**

## 22" Widescreen With Digital T.V. Tuner



- Samsung panel — Model L22AZN6
- Resolution: 1680 x 1050 — **HDMI + VGA**
- Response Time: 5ms
- Contrast Ratio: 1000:1
- 3 Year Warranty

MOGRE005 **$519.00**

## LG Square 19" Monitor



- Resolution: 1280x1024 — Model LG1919S
- Response Time: 8ms
- Contrast Ratio: 1400:1
- 3 Year Warranty

MOLGS025 **$275.00**

## LG Widescreen 19" Monitor



- Resolution: 1440x900 — Model L194WT-SF
- Response Time: 5ms
- Contrast Ratio: 2000:1
- 3 Year Warranty

MOLGS026 **$275.00**

## BenQ FP222W-B 22"



With 1680 x 1050 (WSXGA+) resolution and 5mS refresh rates, the FP222W delivers a crisp and crystal-clear screen image.

**Was $429**
**– Save $60**

MOBEN055 **$369**

## Composite Video to VGA Converter



Use your computer monitor with any AV source such as a **Wii/playstation**, DVD player, VCR or Security camera. Monitor, S-Video or RCA input selected from remote control. Throughput connection from computer to monitor

CBELE002 **$92.95**

## VGA to Composite Video Converter



Display your computers image on a TV or record to a VCR Display on both PC and TV simultaneously. S-Video or RCA output sockets Powered of the USB port. Plugs inline with computer monitor

CBELE001 **$92.95**

## USB to VGA Adapter



Run a second monitor off your USB port.

**1680 x 1050 at 16Bits**
**1440 x 900 at 32 Bits**

DCAUS100 **$124.95**

## VGA Splitter




Duplicate your monitors image on to multiple screens. Up to 2048 x 1536 video resolution @ 60Hz

DCELE000 **2 OUTPUT** **$79.95**

DCELE001 **4 OUTPUT** **$99.95**

## Netgear Storage Central SC101

Innovative product for storing and protecting music, games, photos, videos and other important files on a secure device. Simply insert one or two 3.5-inch IDE drives of any capacity into Storage Central, then connect to any router or switch and Smart Wizard takes care of the configuration. Storage Central functions like a local disk drive but without requiring a dedicated PC. Hard drives can be used in RAID for further data protection



CANET000 **$179.95**

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**Fax : (02) 9267 5042 Email : sales@adelong.com.au**

## 35 IN 1 CARD READER

Supports MS, MS PRO/PRO DUO, Compact Flash/MicroDrive, MMC and SD, Mini SD, Micro SD and XD. Includes USB Cable




MMBES003 **$22**

## ZYNET USB CARD READER

Includes Extension Cable

- To Suite Compact Flash/MicroDrive MMZYN006
- To Suite SD/MMC MMZYN007
- To Suite Memory Stick Pro/Pro Duo MMZYN012

One Low Price of **$19.90**



## KORJO TRAVEL ADAPTORS

- For eletrical appliances from overseas being used in Australia.
- Output to suit U.S.A., Japan, Germany, France, Italy and Switzerland sockets

**Note: these adaptors do NOT convert voltage**



CBKOR003 **$11.95**

- Includes Surge Protection circuit.
- Output to suit U.S.A., Japan, Germany, France, Italy and Switzerland sockets

**Note: these adaptors do NOT convert voltage**



CBELE000 **$8.95**

**For Australian appliances being used Overseas**

- European (2 round pins)
- U. K. and Ireland (3 flat pins)
- USA & Japan (2 flat pins + round earth)

**Note: these adaptors do NOT convert voltage**



CBKDR001 **$9.75**
CBKDR002 **$9.75**
CBKDR000 **$9.75**

## HIGH CAPACITY ALKALINE BATTERIES

### OSEL Batteries

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|---|---|---|---|
| AAA | 4 PK | PSOSE000 | **$2.95** |
| AAA | 16 PK | PSOSE000 | **$9.95** |
| AA | 4 PK | PSOSE000 | **$2.95** |
| AA | 16 PK | PSOSE000 | **$9.95** |
| C cell | 2 PK | PSOSE000 | **$2.95** |
| D cell | 2 PK | PSOSE000 | **$3.95** |
| 9V | 4 PK | PSOSE000 | **$2.95** |




## USB FLASH DRIVES

5 Year Warranty

Kingston TECHNOLOGY

1GB Was $23.95 Now **$17.95** BUKIN025
2GB Was $36.95 Now **$26.95** BUKIN026
4GB Was $64.95 Now **$49.95** BUKIN027
8GB Was $109.95 Now **$89.95** BUKIN028




## SECURE DIGITAL

Includes Protective Carry Case. Lift Time Warranty.

1GB **$23.95** BUKIN003
2GB **$36.95** BUKIN008
4GB **$59.95** BUKIN018

Life Time Warranty




## MICRO SD

Includes Protective Carry Case and Adaptor to Full Sized SD - Lift Time Warranty

1GB **$24.95** BUKIN012
2GB **$42.95** BUKIN020
4GB **$79.95** BUKIN030

Life Time Warranty




## MINI SD

Includes Protective Carry Case and Adaptor to Full Sized SDCard
Lift Time Warranty

1GB **$24.95** BUKIN013
2GB **$42.95** BUKIN011

Life Time Warranty




## COMPACT FLASH

Includes Protective Carry Case
Lift Time Warranty

2GB **$44.95** BUKIN009
4GB **$64.95** BUKIN024

Life Time Warranty




## SONY M2

Includes USB Adapter

2GB **$79.95** MSSON019
4GB **$109.95** MSSON020




## SONY MEMORY STICK PRO DUO

2GB **$89.95** MSSON021
4GB **$109.95** MSSON018



# Adelong Computers

**Opening Hours:**
Monday 9:00am - 6:30pm
Tuesday 9:00am - 6:30pm
Wednesday 9:00am - 6:30pm

## Adelong Media player

Specifically designed for home theatre use. Both options are pre-configured with Windows XP Home Edition. The small stylish black case will not look out of place in your lounge room. Both have Digital audio (co-ax and optical) outputs for connectivity with home theatre amps. Both have options of DVI or HDMI digital or VGA analogue outputs for video hook up. Digital and analogue TV tuning capable, front mounted card reader and wireless keyboard with trackball mouse complete these systems. (can be optional configured with Windows Vista)

### Basic:

- **Microsoft Windows XP Home**

**$789**

- AMD Dual-Core 4200+
- 1G Ram
- Gigabyte GA-MA69GM-S2H Motherboard
- Seagate 160GB Hard drive
- Leadtek DTV2000H Analogue+Digital TV tuner
- Internal Skymaster Card Reader
- LG GSA-H55N DVD/CD Burner
- Wireless Entertainment Keyboard
- Tsunami 101 Case
- Trend Micro Internet Security 2008



### Advanced:

- **Microsoft Windows XP Home**

**$1099**

- AMD Dual-Core 4200+
- 2 x 1G Ram
- Gigabyte GA-MA69GM-S2H Motherboard
- ASUS Nvidia EN8600GT Dedicated Graphics 256MB
- Seagate 500GB Hard drive
- Leadtek DTV2000H Analogue+Digital TV tuner
- Internal Skymaster Card Reader
- LG GSA-H55N DVD/CD Burner
- Wireless Entertainment Keyboard
- Tsunami 101 Case
- Trend Micro Internet Security 2008

*Benefits over the basic system - Ram upgrade to 2GB, larger hard drive and dedicated dual digital output graphics card*

## Skymaster Internal Card Reader




- Supports all popular media cards

MMSKY002

**$25.95**

## Sempron Value

Representing excellent value for an entry level computer, this system is perfect for the home user. More than capable for standard applications like surfing the internet, emailing, uploading and viewing pictures from your digital camera or school/university students needing a professional edge on assignments.

- **XP HOME EDITION**
- AMD Sempron LE-1100
- 512MB Ram
- Gigabyte GA-M61SME-S2L Motherboard
- Seagate 80GB hard drive
- Great Wall L9SOA 19" 5ms Widescreen Monitor
- LG GSA-H55N DVD/CD Burner
- Microsoft Wired Desktop 500
- Tsunami 321B Case (400W)
- Trend Micro Internet Security 2008



**$769**

## Adelong "Box Only" systems

Adelong "Box Only" systems are ideal if you have had a computer go down, but don't require a monitor, keyboard or mouse. These systems are supplied without operating systems, so you can install your own. We can even configure using your old hard drive.

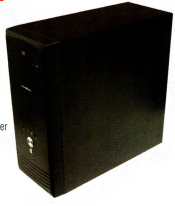
### AMD 4200+ Dual Core

- 1G Ram
- Gigabyte GA-M61SME-S2L Motherboard
- Seagate SATA II 160GB Hard Drive
- LG GSA-H55N DVD/CD Burner
- Tsunami 321B Case (400W)

**$419**

### Intel E2160 Dual Core

- 1G Ram
- Gigabyte GA-945GCMX-S2 Motherboard
- Seagate SATA II 160GB Hard Drive
- LG GSA-H55N DVD/CD Burner
- Tsunami 321B Case (400W)



**$419**

### Intel Core 2 Quad Processor Q6600

- 1G Ram
- Gigabyte GA-P31-S3G Quad Motherboard
- Sapphire Radeon X1550 Dedicated Graphics 256MB
- Seagate SATA II 160GB Hard Drive
- LG GSA-H55N DVD/CD Burner
- Tsunami 321B Case (400W)

**$809**

All prices are correct at time of printing, please check our website for most UP-TO-DATE pricing.


**SALES HOTLINE : 02 9260 3188**
Fax : (02) 9267 5042 Email : sales@adelong.com.au

Thursday 9am - 8:30pm
Friday 9am - 6:30pm
Saturday 10am - 4:30pm
Sunday 10am - 4:30pm

# www.adelong.com.au

ADELONG australia

## AMD Dual Core Value

Adelong has carefully chosen the equipment to keep the cost down and still give you a good performing computer.

- **Windows Vista Home Basic Edition**
- Athlon64X2 Dual-Core 4200+
- 1G DDR2 667MHz Ram
- Gigabyte GA-M61SME-S2L Motherboard
- Seagate SATA II 160GB Hard Drive
- Great Wall 19" Widescreen LCD Monitor
- LG GSA-H55N DVD/CD Burner
- Logitech Deluxe 660 Cordless Desktop
- Tsunami 321B Case (400W)
- Trend Micro Internet Security 2008



**$879**

## Intel Dual Core Value

The power of Intel at an economical price.

- **Windows Vista Home Basic Edition**
- Intel Dual-Core E2160
- 1G DDR2 667MHz Ram
- Gigabyte GA-945GCMX-S2 Motherboard
- Seagate SATA II 160GB Hard Drive
- Great Wall 19" Widescreen LCD Monitor
- LG GSA-H55N DVD/CD Burner
- Logitech Deluxe 660 Cordless Desktop
- Tsunami 321B Case (400W)
- Trend Micro Internet Security 2008

**$879**

## AMD Midrange

Get more done in less time with a higher spec processor, more RAM and larger hard drive for your files. Dedicated Asus graphics card ensures quality reproduction of your work or movie playback.

- **Windows Vista Home Premium Edition**
- Athlon64X2 Dual-Core 5200+
- 2 x 1G DDR2 667MHz Ram (2GB Total)
- Gigabyte GA-M61SME-S2L Motherboard
- ASUS N-Vidia EN8500GT Graphics 512MB
- Seagate SATA II 320GB Hard Drive
- LG 19" Widescreen LCD Monitor
- LG GSA-H55N DVD/CD Burner
- Logitech Deluxe 660 Cordless Desktop
- Tsunami 826K Case (400W)
- Trend Micro Internet Security 2008



**$1239**

## Intel Quad Core Midrange

Step up to Quad Core technology. Dedicated graphics card from ASUS ensures a superior overall experience

- **Windows Vista Home Premium Edition**
- Intel Quad-Core Q6600
- 2 x 1G DDR2 667MHz Ram (2GB Total)
- Gigabyte GA-P31-S3G Motherboard
- ASUS N-Vidia EN8500GT Graphics 512MB
- Seagate SATA II 320GB Hard Drive
- LG 19" Widescreen LCD Monitor
- LG GSA-H55N DVD/CD Burner
- Logitech Deluxe 660 Cordless Desktop
- Tsunami 82 6K Case (400W)
- Trend Micro Internet Security 2008

**$1469**

## Intel Core2Duo Performance

The best performing Dual Core system, with 3GB memory. Definitely the computer to choose when performance gaming is all that matters

- **Windows Vista Home Premium Edition**
- Intel Core2Duo E8400 (3GHz-6MB cache)
- 3 x 1G DDR2 667MHz Ram (3GB Total)
- Gigabyte GA-X38-DS4 (SLI) Motherboard
- Gigabyte 8800GT 512MB DDR3 Graphics
- Seagate SATA II 500GB Hard Drive
- BenQ 22" Widescreen LCD Monitor
- LG GSA-H55N DVD/CD Burner
- Logitech LX710 Wireless Keyboard
- Logitech Laser Mouse
- High quality ZIRCO case
- Cooler Master 650W PSU
- Trend Micro Internet Security 2008



**$2289**

## Intel Core2Quad Performance

3GB of memory, excellent processor and high end gamers' graphics card ensure this PC will perform past your expectations.

- **Windows Vista Home Premium Edition**
- Intel Quad-Core Q6600 (2.4GHz-8MB cache)
- 3 x 1G DDR2 667MHz Ram (3GB Total)
- Gigabyte GA-X38-DS4 (SLI) Motherboard
- Gigabyte 8800GT 512MB DDR3 Graphics
- Seagate SATA II 500GB Hard Drive
- BenQ 22" Widescreen LCD Monitor
- LG GSA-H55N DVD/CD Burner
- Logitech LX710 Wireless Keyboard
- Logitech Laser Mouse
- High quality ZIRCO case
- Cooler Master 650W PSU
- Trend Micro Internet Security 2008

**$2359**

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Visit us online at www.adelong.com.au
or come in at 129 York Street Sydney NSW 2000

Purchases on Amex are subject to 3% surcharge And Purchases on Diners are subject to 4% surcharge

# Adelong Computers

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Wednesday 9:00am - 6:30pm

## Keyboard

### Logitech Cordless 660



Includes Keyboard, optical mouse, receiver and batteries

IOLOG121 **$53.90**

### Logitech G15 Gaming Keyboard



The Logitech G15 keyboard is completely customizable to help you play better. Wired USB connection

**Was $129.00 Save $10.00**

IOLOG094 **$119.00**

### Logitech LX710



- Powerful, side-mounted controls give quick access to your favorite media applications, including Apple iTunes or Windows Media Player
- Includes LX7 Laser mouse

IOLOG107 **$124.95**

### Logitech 250 Bundle



Very reliable wired Keyboard and Mouse

IOLOG110 **$29.00**

### Microsoft Desktop 500



- Includes wired PS/2 keyboard and USB optical mouse
- 10 Hot keys

IOMST176 **$34.95**

### Wireless Keyboard + Trackball



- Ideal for Media Center use
- Incorporated mouse buttons and trackball IR wireless, up to 8m range

IOLES000 **$39.95**

## Mouses

### Logitech LX8 Laser



Soft rubber grip, wireless USB connection and Laser sensor make for an excellent mouse

IOLOG119 **$61.95**

### Logitech VX Revolution



- Precision laser design
- Zoom controls
- 2 extra short cut keys

IOLOG117 **$119.95**

### Microsoft 6000 Laser



- Ergonomic styling
- Two extra short cut buttons
- Wireless USB connection

IOLOG119 **$69.95**

### Optical USB Car Mouse



- Blue LED head lights

IOTON001 **$14.90**

### Powertek Wireless



- Mini USB mouse
- Ideal for use with laptops

IOPOW000 **$24.90**

### Logitech LX5



- Wireless Optical mouse
- Invisible light technology

IOLOG103 **$35.44**

## Web Cams

### Toshiba




Small and compact design
Stand or clip on to your monitor
1.3MP sensor, capable of 30FPS

IOTOS000 **$34.95**

### Logitech Family



- Video capture: 640x480 pixels
- Still image capture: 640x480 pixels
- Frame rate: Up to 30 fps
- Manual focus

IOLOG096 **$39.95**

### Logitech CHAT



Includes compact headset
2 year warranty
Res: 640x480, capable of 30FPS

**Was $64.95 Save $15**

IOLOG085 **$49.95**

### Logitech Quickcam IM



- Makes launching, muting and closing video sessions easy.
- Sharper images and video performance even in dim lighting.
- Integrated Microphone with RightSound technology
- Snapshot button - Taking stills is fast and easy.

IOLOG113 **$59.95**

**SALES HOTLINE : 02 9260 3188**
**Fax : (02) 9267 5042 Email : sales@adelong.com.au**

## Headsets

### Logitech 250 USB headset

- Great for multiplayer gaming, voice command and chat, online conferencing, or just listening to music.
- USB connect to PC



MMLOG321 **$55.00**

### Verbatim USB wireless headset

- Power and volume controls on headset
- Cushioned earpieces for long-wearing comfort
- USB RF Transmitter- up to 30m transmission range
- Powered by 2AA Batteries (not included)



MMVER170 **$109.00**

### Backphones Headset

- Microphone on cable
- Connects to Mic/speaker jacks



MMLOG313 **$12.95**

### Verbatim Headset

- Microphone on Boom
- Volume control
- Connects to Mic/speaker jacks



MMVER114 **$18.00**

## USB Sound Device

### Sound Blaster Audigy 2 NX USB

**Industry standard for external digital audio recording**

- Incredible Realism with EAX ADVANCED HD Game Effects
- USB 2.0 Hardware Ready for High Speed Connectivity
- Convenient Music Playback with Remote Control Recording and Connectivity Options
- 5.1/7.1 out put for speakers
- Digital audio outputs for connection to home theatre amplifiers



MMCRE139 **$204.95**

### CREATIVE Inspire M2600



Excellent vocal reproduction
Subwoofer for extended bass response
Wired remote volume control

MMCRE140 **$79.00**

### R-10 Speakers

Logitech



Compact design
Volume and headphone jack on speaker

MMLOG018 **$29.00**

### CREATIVE Sound blaster Live USB



High quality external sound card
5.1 out put for speakers
Digital audio outputs for connection to home theatre amplifiers

**WAS $129.00**
**SAVE $20**
MMCRE143 **NOW $99.00**

### CREATIVE Inspire M5300



Excellent vocal reproduction
5.1 design for surround sound
Subwoofer for extended bass response
Wired remote volume control

**WAS $109.95**
**SAVE $20**
MMCRE094 **NOW $89.95**

### X-230 Speakers

Logitech



Subwoofer for extended bass response
2 speakers per channel
Volume and headphone jack on speaker

MMLOG013 **$79.00**

### USB Sound device




Can t get your sound device working? This simple USB device is the ideal way to creat Microphone inputs and headphones output on a laptop or desktop.

MMSKY008 **$21.95**

### CREATIVE Sound blaster Audigy Value



High quality internal sound card
7.1 out put for speakers
Digital audio outputs for connection to home theatre amplifiers

MMCRE114 **$68.00**

### X-530 Speakers

Logitech



5.1 for surround sound
Subwoofer for extended bass response
2 speakers per channel
Volume and headphone jack on speaker

**WAS $104.95**
MMLOG014 **NOW $99.95**



Purchases on Amex are subject to 3% surcharge And Purchases on Diners are subject to 4% surcharge

# Adelong Computers

**Opening Hours:**
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## ADSL 2+ Routers

Routers with Built-In ADSL2+, modems and ethernet switch to share internet access and network resources with wired and wireless computers.



Billion BiPAC 7300
NWBILO32 **$76.20**



Netgear DG834
NWNETO59
**$92.95**



Billion BiPAC 7402L-M
NWBILO21 **$176.00**

## ADSL 2+ Modems

For direct connection to a single PC or existing Router. Selecting a separate router and modem provides the ability to change to different connection types in the future



Billion BiPAC 7000 USB
NWBILO05 **$54.90**



Netgear DM111P
NWNETO46
**$71.95**



Linksys AM300
NWLINO45 **$71.95**

## Network Switches

Allows the connection of multiple wired PCs to share network resources and data.

### 10/100 Switches



Netgear FS608 8 Port Switch NWNETO45 **$49.95**
D-link DES-1005D 5 Port NWDLI048 **$54.95**
D-link DES-1008D 8 Port NWDLI022 **$69.00**

### 10/100/1000 Switches



D-link DGS-1005D 5 Port NWDLI139 **$87.90**
Netgear GS608 8 Port NWNETO44 **$109.95**
D-Link DGS-1008D 8 Port NWDLI113 **$149.00**

### Rack Mountable Switches

Netgear JFS516 16 Port 10/100Mbps NWNETO45 **$114.00**
D-link DES-1016D 16 Port 10/100Mbps NWDLI032 **$129.00**
Netgear JFS524 24 Port 10/100 Mbps NWNGR039 **$159.95**
D-Link DGS-1016D 16 Port 10/100/1000 Mbps NWDLI150 **$349.00**



## Wired Routers

For use with cable, ADSL and other connections where a modem is already available.



Netgear RP614 4-Port
NWNETO65 **$79.95**



D-Link DIR-120 4-Port + Print Server
NWDLI154 **$87.00**



D-Link DI-707P 7-Port + Print Server
NWDLI078 **$185.00**

## Dial-Up Modems

NetComm 56K V.90 Internal PCI Modem



FMNETO26
**$24.95**

Netcomm Serial CD2004 Mega-I-Modem



FMNETO55 **$69.00**

Netcomm AM-5066 Rave III USB Modem



FMNETO58 **$69.00**

## Billion 7300GX 3G/ADSL2+ Wireless Modem Router

Enjoy the freedom of secure, high-speed Internet connectivity at the home or office, or while on the road with Billion's compact BiPAC 7300GX dual-interface ADSL2+/3G firewall and router. Using your 3G data card, you can share your internet connection via cable with the 4 port switch or wirelessly to laptops. The 7300GX can even be powered from 12V with the supplied cable for use on the move



NWBILO46 **$219.00**

## What is RangeMax NEXT Wireless-N?

Rangemax NEXT Wireless-N extends the possibilities of wireless home networking by providing a Steady-Stream approaching 300Mbps, and is compliant with draft 802.11n. This next generation wireless standard utilizes advanced MIMO (Multi-In, Multi-Out) technology, which delivers incredible speed and range. A Rangemax NEXT wireless network maintains stable connections and enough bandwidth to surf the Internet, download MP3s, make Internet phone calls, share files, play network games, and stream high-definition videos, simultaneously at any distance or location in the home or office.




## PCI Network Adapters:

Skymaster 10/100M PCI Card (N-200) NWSKY002 **$15.00**
Skymaster 10/100/1000M PCI Card NSWKY004 **$29.50**
D-Link DGE-530T 10/100/1000Mbps PCI Card NWDLI121 **$33.00**



### 54Mbps PCI Wireless Adapters

D-Link DWL-G510 Wireless Card NWDLI124 **$39.00**
Netgear WG311 Wireless Card NWNGR042 **$39.95**



### 108Mbps PCI Wireless Adapters:

D-Link DWL-G520 Wireless Card NWDLI091 **$72.90**



## USB Network Adapters:

### USB to Ethernet Adapter

Skymaster USB Ethernet Adapter NWSKY006 **$28.95**



### USB Wireless Adapter

Netgear WG111 USB 54Mb NWNETO48 **$39.95**
D-Link DWL-G122 USB 54Mb NWDLI133 **$44.90**
Netgear WPN111 RANGEMAX NWNETO53 **$68.95**



### USB Bluetooth Adapter

SkymasterV2.0 Adapter NWSKY009 **$29.90**



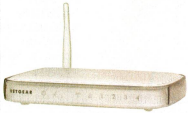
## Wireless Routers

***"All models include a 4 port network switch. Suitable for sharing internet connection from an existing modem to desktops and laptops using wireless or wired connections"***



D-Link DI-524 54MB

NWDLT28 **$79.00**



Netgear WGR614 54MB

NWNET042 **$81.95**

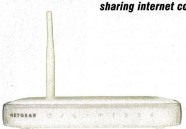


Linksys WRT54G

NWLIN042 **$99.95**

## ADSL2+ Modem Routers with Wireless

***"A complete solution for connecting to your ISP via ADSL2+. All models include a 4 port network switch, suitable for sharing internet connection to desktops and laptops using wireless or wired connections"***



Netgear DG834G

NWNET041 **$139.00**



Linksys WAG200G NWLIN046 **$139.00**



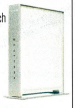
D-Link DSL-G604T

NWDLT29 **$139.00**

## High Coverage 802.11N Wireless

### Netgear DG834N

- ADSL2+ Modem/Router
- Rangemax NEXT Technology
- 4 Port Ethernet Switch
- Double Firewall (NAT + SPI)



NWNET057 **$325.00**

### D-Link DSL-2740B

- ADSL2+ Modem Router
- 4 Port Ethernet Switch
- WPA/WPA2 Encryption
- QoS Support



NWDLT61 **$327.00**

### Netgear WNR834B

- Wired Router
- Rangemax NEXT Technology
- 4 Port Ethernet Switch
- Double Firewall (NAT + SPI)
- Up to 270Mbps Wireless



NWNET056 **$185.00**

### D-Link DIR-635

- Wired Router
- NAT, SPI and VPN Pass through
- USB Port for WCN (Windows Connect Now)
- 4 Port Ethernet Switch



NWDLT47 **$208.95**

## Extended Coverage 802.11n Wireless Adapters



### D-Link DWA-547

Upgrade your desktop computers wireless connectivity with the RangeBooster N 650 Series Desktop Adapter for much faster wireless connection and superior signal strength.

NWDLT53 **$114.95**



### Netgear WN311B

Perfect for streaming video and music, online gaming and networking multiple PCs. High performance Wireless-N range and speed. Smart Wizard installation software

NWNET055 **$165.00**



### D-Link DWA645

RangeBooster N 650 notebook adapter delivers unrivaled wireless performance. Upgrade your notebook computers wireless connectivity.

NWDLT48 **$159.95**



### Netgear WN511B

RangeMax NEXT extends the possibilities of your wireless home network by providing wireless speeds of up to 270Mbps.

NWNET054 **$155.95**

## Office Home and Student 2007



Better and faster results with the new interface
Create high-quality documents
Preview your changes quickly

Includes WORD, EXCEL and POWERPOINT 2007.
Three user licence (install on up to 3 computers)

SWMS7210 **$235.00**

## Office Professional 2007 Academic



Complete suite of productivity and data-base software
Find and use the features you need faster and more easily
Improved junk mail and anti-phishing technologies

Includes OUTLOOK, WORD, EXCEL, ACCESS, CONTACT MANAGER and POWERPOINT 2007.
Three user licence (install on up to 3 computers)

SWMS7211 **$285.00**

## Laptop Universal Power Supply



Switchable voltage 15-24V DC
8 output plugs to suit most laptops
USB port for charging MP3 player

90W PSBES004 **$54.95**
120W PSBES005 **$74.95**

## Leadtek T. V. Tuners

### USB (Digital)

- Leadtek DTV Dongle
- Watch digital TV on your computer
- Includes slim line remote and TV antenna
- Vista compatible



MMLEA009 **$89.95**

### USB (Digital+Analogue)

- Leadtek DTV-Dongle-H
- Tunes to digital or analogue TV and FM radio broadcasts
- Includes slim line remote and TV + FM antennas
- Vista compatible



MMLEA016 **$119.00**

### Internal PCI (Digital+Analogue)

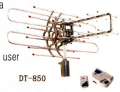
- Leadtek DTV2000H
- Tunes to digital or analogue TV and FM radio broadcasts
- Full feature remote included
- Convert your video tapes to DVDs via the RCA or S-Video capture ports
- Vista compatible



MMLEA011 **$119.00**

## Remote-Controlled Rotating TV Antenna

This television antenna comes complete with a Infra-RED remote control that allows the user to rotate the antenna after installation.
Suitable for both VHF and UHF reception.
Ideal for caravans




ANGEN003 **$39.00**

## External DVD Burner



- Features a LG 20x burner
- Supports Dual Layer, +/-R, +/-RW and DVD-ram discs
- Complete with Nero software
- USB interface to computer
- Powered from supplied 240V adapter

CABES004-1 **$104.90**

## 7-Port USB Hub



- Includes power adaptor and USB cable

NWGEN045 **$29.95**

## PDA Pen



Includes PDA pen, pencil, red & black pens

MSGEN159 **$8.95**

## PDA Pen + Laser



- Includes PDA & black pens
- Laser pointer
- White LED torch

MSTOND11 **$12.95**

## 4-Port USB Hub

- Unpowered



MSADE089 **$14.90**

## AIRPLANES

### Apache AH-64 Mini Infrared Control Helicopter



Unique rotor-blades system for steady lift
Foam design helps prevent accidental damage
Remote: 3 channel IR remote control with built in charger
Range: 15m
Battery: 7 mins flight time, 20 mins charge time
Size: 15cm in Length, 12.5cm Main Rotor

TYGEN002 **Was $39.95** **Now $29.95** **Save $10**

### Seagull RC Helicopter with GYRO



This helicopter uses a gyroscope to maintain control. A gyroscope is a device for measuring or maintaining orientation giving more stable control even in windy conditions.
6 channel controller
Fly-time: 17 mins

TYGEN035 **$199.00**

### Remote Control B-3 Stealth Bomber



Ultra light weight Foam Body
Remote: 3 Channel in 27MHz or 40MHz
Range: 200m
Battery: 10 mins flight time, 20 mins charge time
Size: 28cm Long, 60cm Wing Span

TYGEN005 **Was $79.00** **Now $69.00** **Save $10**

### Flying Seagull remote control Plane



Dual Propellers
Lightweight foam single wing
Remote: 2 channel
Range: 250m
Battery: 10 mins flight time, 150 mins charge time
Size: 91.5 cm in length, 65.5cm wing span

TYGEN011 **Was $95.00** **Now $85.00** **Save $10**

### Pioneer Radio remote control helicopter

Similar in performance to our Apache AH-64 but constructed of more robust materials
Co-axial double-propeller
Excellent stability in flight
Remote:
3 channel Digital
Range: 70m
Battery: 6 mins flight time, 60 mins charge time
Size: 57cm in Length, 53cm Main Rotor



TYGEN004 **Was $129.00** **Now $92.00** **Save $37**

### Apache AH-64 remote control Apache Helicopter

Co-axial double-propeller
Swift and Stable Control
Lightweight and damage resistant PA and PP plastic Materials
Remote: 3 channel Digital
Range: 70m
Battery: 6 mins flight time, 60 mins charge time
Size: 35cm in Length, 38cm Main Rotor



TYGEN003 **Was $139.00** **Now $99.00** **Save $30**

## CD Wallets

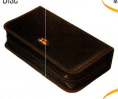
Zip up CD wallets to store your CDs in.

32 Disc



MSJAN005 **$5.50**

96 Disc



MSJAN004 **$9.90**

240 Disc



MSJAN006 **$17.90**

400 Disc

MSJAN008 **$25.00**

## Sea King RC Helicopter with GYRO - 3D

- Mechanical a gyroscope to maintain control and orientation, ensuring stability even in windy conditions
- CCPM control system and High precision, high inertial main rotating head
- Tail rotor and belt drive system
- Auto-rotation system design
- Battery: 11.1V-2200Ah Li-polymer battery
- 6 channel controller
- Fly-time: 17 mins
- Class 450



TYGEN034 **$599.00**

## Plastic CD Storage Boxes

These storage boxes have transparent plastic sides built around a tough aluminium frame. They include slips that run on rails for your CDs.



MSJAN013 **$18.95**

80 Disc



MSJAN022 **$21.95**

120 Disc

Visit our website to view our comprehensive range of tools

## TOOLS

### Attache Case

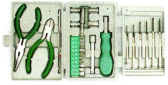
- Adjustable foam covered divisions
- Built in strap and pouches to hold tools
- 3 digit combination lock
- 37cm x 25cm x 11.5cm



TLGEN038 **$29.95**

### Precision Tool Kit

- 4.5"Side cutters
- 4.5"long nose pliers
- Tweezers
- 6 x precision screwdrivers
- Hex head handle
- 2x hex head extension bars
- T10, T15, T20 bits
- 3x Philips, 3x flat head bits
- Socket adaptor
- 5, 6, 8, 10mm sockets
- 3 way fold out carry case



TLGEN020 **$11.95**

### Cordless Screwdriver

- Forward / Reverse switch
- 3.6 volt - 150 RPM motor
- 6 position torque adjustment
- Ni-CAD rechargeable battery pack
- Pistol or straight grip action

**Includes:**

- 28 assorted screwdriver bits
- 8 x socket bits (5mm - 11mm)
- Bit extension bar
- 240volt charger
- Blow-wave carry case



TLGEN013 **$27.95**

### 4.5" Precision Tools

- Long Nose TLGEN043
- Side Cutters TLGEN033
- End Cutters TLGEN044
- Flat Grip Pliers TLGEN021
- Bull Nose Pliers TLGEN022



**$11.95**

### 4pc Tweezers



TLGEN034 **$4.95**

### Screwdrivers

5.5mm Flat TLGEN032 **$2.85**
6mm Flat #1 Philips TLGEN033 **$2.95**
#2 Philips TLGEN034 **$2.85**
TLGEN035 **$2.95**



### 7pc Screwdrivers

Hex head handle
Philips # 0, 1 &2
Flat 3.8, 5, 6mm



TLGEN042 **$11.22**

### 7pc TORX drivers

T5, T6, T7,
T8, T9, T10, T15
40mm shaft



TLGEN036 **$6.95**

### 6" Linesman Tools

Side Cutters — TLGEN015 **$2.99**



Long Nose Pliers — TLGEN016 **$2.99**



Bull Nose Pliers — TLGEN017 **$3.49**



### 9pc Hex Keys

Ball joint heads
1.5, 2, 2.5, 3,
4,5,6,8,10mm



TL000000 **$19.95**

### Modular Crimping Tools

Crimps RJ11-12-45



TLGEN026 **$19.95**

Includes Ratchet Action



TLGEN025 **$37.95**

### 5 Micro Cutters



TLGEN018 **$6.95**

### 6" Side Cutters



TLHJA000 **$9.95**

### 6" Bullnose Pliers



TLHJA001 **$9.95**

### Shifters



6" TLGEN029 **$4.95**
8" TLGEN030 **$6.95**

### Punch Down Tools

Scissor action cutter
Type 110/88
Reversible blade



TLGEN024 **$8.95**
TLGEN033 **$19.95**

### Mini Vice

Suction grip to desk
Max opening: 30mm



TLGEN031 **$7.95**

### Hobby Knife

Metal guide
Blade: 55mm



MSASS008 **$2.50**

### Hobby Files

5 Piece
Square, triangle,
flat & 2x round
160mm each



TLGEN039 **$6.95**

### Plastic Storage Box



5 compartment
160x85x25mm
TLGEN040 **$4.85**
18 compartment
255x175x40mm
TLGEN041 **$5.45**

### Wire strippers

T-Rex
Cut/strip Dia.0.5 ?2mm



TLGEN012 **$11.95**

Scissor action
Strips wire Dia 1.0, 1.6,
2.0, 2.6, 3.2mm



TLGEN012 **$11.95**

Thursday 9am - 8:30pm
Friday 9am - 6:30pm
Saturday 10am - 4:30pm
Sunday 10am - 4:30pm

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## Cat 5e Cables

- Protective ears on plug to help protect against broken clips and stop snags while running cables
- Strain relief to reduce chance of conductor breakage
- Buy 10, receive 10% discount

| | | |
|---|---|---|
| 0.5m Blue | CBCAB000 | $3.50 |
| 1m Blue | CBCAB001 | $3.95 |
| 2m Blue | CBCAB002 | $4.50 |
| 3m Blue | CBCAB003 | $5.50 |
| 5m Blue | CBCAB004 | $6.95 |
| 10m Blue | CBCAB005 | $9.95 |
| 15m Blue | CBCAB006 | $14.95 |
| 20m Blue | CBCAB007 | $18.95 |
| 30m Blue | CBCAB008 | $23.40 |
| 40m Blue | CBCAB009 | $27.20 |
| 50m Blue | CBCAB010 | $31.10 |
| 0.5m Grey | CBCAB011 | $3.50 |
| 1m Grey | CBCAB012 | $3.95 |
| 2m Grey | CBCAB013 | $4.50 |
| 3m Grey | CBCAB014 | $5.50 |
| 5m Grey | CBCAB015 | $6.95 |
| 10m Grey | CBCAB016 | $9.95 |
| 0.5m Yellow | CBCAB021 | $3.50 |
| 1m Yellow | CBCAB022 | $3.95 |
| 2m Yellow | CBCAB023 | $4.50 |
| 3m Yellow | CBCAB024 | $5.50 |
| 5m Yellow | CBCAB025 | $6.95 |
| 10m Yellow | CBCAB026 | $9.95 |

Cross over cables for connection between two PC

| | | |
|---|---|---|
| 2m Red | CBCAB030 | $4.50 |
| 5m Red | CBCAB032 | $6.95 |
| 10m Red | CBCAB033 | $9.95 |



## KVM Switches

### USB KVM + Cables



Use one Keyboard, Mouse and Monitor with two PC
Switch via hot keys or box mounted button
Includes Monitor and USB cabling

DSSKV000 **$54.95**

### PS/2 KVM + Cables



Use one Keyboard, Mouse and Monitor with two PC
Switch via hot keys or box mounted button
Includes Monitor and PS/2 cabling

**2 Port** DSBES000 **$43.50**

**4 Port** DSBES001 **$69.00**

## Power Boards

### 8-Way Powerboard + EMI/RFI and Surge Suppression

Ideal for computer or home theatre applications
Full 3-Line Surge Protection
Phone/Fax/Modem/ADSL Line Protection
Coax Cable Line Protection (F-Type Connection)
144,000A Spike Protection
3,444 Joules Surge Protection
1.8m Cable Length
EMI/RFI Noise Filter
1 Main Switch on the Powerboard



CBCAB90A **$49.95**

### Surge Protected Power board

ON/OFF switch
Surge and spike protection
Safety overload protection



**4 Way** CBCAB932 **$14.95**

**6 Way** CBCAB933 **$16.95**

## Computer Cases

### Tsunami 101K Mini-case



- Excellent for Mini-PC case
- Easy access to internals with thumb screws
- Good thermal design with 2x rear mounted 60mm fans
- Stylish matte black finish, suitable for media center PC's

CATSU006 **$69.95**

### Tsunami 321K



- 400W Power supply with IEC outlet
- Excellent airflow with side grille and fan duct
- Option for rear mount 120mm fan
- Front USB and audio ports

CATSU020 **$49.95**

### Tsunami 826K



- 400 Watt Power supply 120mm Fan front mounted
- Side mounted USB ports

CATSU000 **$69.95**

### Zirco High Quality Case



- Front metal is mesh with dust filter giving excellent cooling
- Quick connect mounting hardware
- Top mounted USB ports
- No power supply - choose from below

CAPCID16 **$79.00**

## Power Supplys

### POWER SUPPLYS



**400 Watt**
80mm rear mounted fan
PSYAN000 **$35.00**

**500 Watt**
120mm fan for reduced noise output
PSYAN005 **$45.00**

**600 Watt**
120mm fan for reduced noise output
PSYAN009 **$69.95**

### Coolermaster Power Supplys

All cooler master Power supplys include a 12cm SILENT fan for quiet operation.

**460 Watt**
PSCO0005 **$74.95**

**550 Watt**
Includes 1 x 6 pin connector for graphics cards
PSCO0006 **$89.95**

**650 Watt**
Includes 2 x 6 pin connector for two graphics cards in SLI mode
PSCO0007 **$119.95**

**850 Watt**
Extreme power for Extreme systems
PSCO0008 **$290.00**



## UPS

### UPS with LCD display

Protect your computer from voltage fluctuations with these line interactive Uninterruptible power supply.
Both are capable of controlling your computer to safely shutdown in the event of an extended power loss situation



650 Watt CBCAB920 **$149.00**
1000 Watt CBCAB921 **$199.00**

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or come in at 129 York Street Sydney NSW 2000

Purchases on Amex are subject to 3% surcharge And Purchases on Diners are subject to 4% surcharge

# Adelong Computers

**Opening Hours:**
Monday 9:00am - 6:30pm
Tuesday 9:00am - 6:30pm
Wednesday 9:00am - 6:30pm

All prices are correct at time of printing, please check our website for most UP-TO-DATE pricing.

## Processors

AMD

| | | |
|---|---|---|
| Sempron LE-1100 | CPAMD169 | $62.95 |
| Athlon 64X2 4200+ | CPAMD171 | $109.95 |
| Athlon 64X2 4400+ | CPAMD170 | $129.50 |
| Athlon 64X2 5200+ | CPAMD151 | $195.00 |
| Athlon 64X2 5600+ | CPAMD166 | $209.50 |
| Athlon 64X2 6000+ | CPAMD167 | $239.50 |
| Athlon 64X2 6400+ | CPAMD173 | $271.00 |
| Phenom Quad Core 9500 | CPAMD174 | $309.00 |
| Phenom Quad Core 9600 | CPAMD175 | $379.00 |

intel

| | | |
|---|---|---|
| Dual-Core E2160 | CPINT187 | $114.95 |
| Core2Duo E4500 | CPINT286 | $189.95 |
| Core2DuoE6550 | CPINT185 | $254.50 |
| Core2DuoE6750 | CPINT284 | $294.50 |
| Core2DuoE8400 | CPINT285 | $329.50 |
| Core2Quad Q6600 | CPINT177 | $409.00 |

## Desktop Menory

**DDR2 – 667MHz+**

| | | |
|---|---|---|
| 512MB 667MHz | RAGEN136 | $24.95 |
| 1G 667MHz Ram | RAGEN135 | $35.95 |
| 512MB 800MHz | RAGEN139 | $34.95 |
| 1G 800MHz | RAGEN138 | $49.95 |
| Kingston KVR677D2N4/512 | RAKIN031 | $44.95 |
| Kingston KVR667D2N5/1G | RAKIN023 | $59.95 |
| Kingston KVR800D2N5/1G | RAKIN029 | $55.00 |
| Kingston KVR800D2N5/2G | RAKIN034 | $164.95 |
| 512MB | RAGN068 | $45.00 |
| 1GB | RAGEN082 | $89.00 |
| Kingston KVR400X64C3A/512 | RAKIN005 | $69.00 |
| Kingston KVR400X64C3A/1G | RAKIN026 | $105.95 |
| 256MB (Single Sided) | RAGEN031 | $49.00 |
| 256MB (Double Sided) | RAGEN078 | $75.00 |
| 512MB (Double Sided) | RAGEN047 | $85.00 |

## Notebook Memory (So-DIMM)

**DDR2 – 667MHz**

| | | |
|---|---|---|
| 512MB | RAGEN134 | $36.95 |
| 1G | RAGEN137 | $59.95 |
| Kingston KVR667D2S5/512MB | RAKIN032 | $39.95 |
| Kingston KVR667D2S5/1G | RAKIN027 | $69.95 |
| Kingston KVR667D2S5/2G | RAKIN033 | $109.95 |

**DDR – 400MHz**

| | | |
|---|---|---|
| 512MB SO-DIMM | RAGEN132 | $54.95 |
| Kingston KVR333X64SC25/512MB | RAKIN030 | $69.95 |
| Kingston KVR333X64SC25/1G | RAKIN018 | $141.95 |

## Seagate Hard Drives

Seagate

**Desktop SATA II 3.5" (5YR Warranty)**

| | | |
|---|---|---|
| ST380815AS 80GB 8MB | HDSGT075 | $71.00 |
| ST3160815AS 160GB 8MB | HDSGT257 | $88.00 |
| ST3250310AS 250GB 16MB | HDSGT280 | $99.00 |
| ST3320620AS 320GB 16MB | HDSGT217 | $119.00 |
| ST3400620AS 400GB 16MB | HDSGT234 | $177.00 |
| ST3500320AS 500GB 32MB | HDSGT282 | $191.00 |
| ST3750330AS 750GB 32MB | HDSGT283 | $329.00 |
| ST31000340AS 1000GB 32MB | HDSGT279 | $443.00 |

**Desktop IDE 3.5" (5YR Warranty)**

| | | |
|---|---|---|
| ST380215A 80GB 2MB | HDSGT260 | $65.00 |
| ST3160815A 160GB 2MB | HDSGT262 | $77.00 |
| ST3250620A 250GB 8MB | HDSGT230 | $99.00 |
| ST3320620A 320GB 16MB | HDSGT216 | $119.00 |
| ST3400620A 400GB 16MB | HDSGT237 | $169.00 |
| ST3500630A 500GB 16MB | HDSGT238 | $183.00 |
| ST3750640A 750GB 16MB | HDSGT239 | $323.00 |

**Notebook IDE 2.5" (3YR Warranty)**

| | | |
|---|---|---|
| ST980815A 80GB 8MB 5400RPM | HDSGT208 | $89.00 |
| ST9120822A 120GB 8MB 5400RPM | HDSGT270 | $111.00 |
| ST9160821A 160GB 8MB 5400RPM | HDSGT250 | $162.00 |

**Notebook SATA 2.5" (3YR Warranty)**

| | | |
|---|---|---|
| ST980811AS 80GB 8MB 5400RPM | HDSGT264 | $84.00 |
| ST9120822AS 120GB 8MB 5400RPM | HDSGT268 | $111.00 |
| ST9120823AS 120GB 8MB 7200RPM | HDSGT277 | $145.00 |
| ST9160821AS 160GB 8MB 5400RPM | HDSGT263 | $166.00 |
| ST9160823AS 160GB 8MB 7200RPM | HDSGT278 | $199.00 |

## Upgrade Bundles

Adelong upgrade bundles come as parts only, so are ideal for you to install at home, utilising your old hard drives and disc drives. Upgrade can optionally be built by Adelong Technicians for a small service fee of $22.

### AMD Dual Core Advantage

SPADE281-030 **$289**

- AMD Athlon 64X2 Dual Core 4200+
- 1G DDR2 667MHz Ram
- Gigabyte GA-M61SME-S2L Motherboard
- Tsunami 321B Case (400W)

### AMD Dual Core Mid Range

SPADE281-060 **$399**

- AMD Athlon 64X2 Dual Core 5200+
- 1G DDR2 667MHz Ram
- Gigabyte GA-M69GM-S2H Motherboard
- DVI+VGA video and digital audio outputs
- Tsunami 321B Case (400W)

### INTEL Dual Core

SPADE281-200 **$279**

- Intel E2160 Dual Core
- 1G DDR2 667MHz Ram
- Gigabyte GA-945GCMX-S2 Motherboard
- Tsunami 321B Case (400W)



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## Graphics Cards (PCI-Express 16x)

### Sapphire Radeon X1550 – 256MB



- ATI Chip-set
- Direct X 9 & Shader 3 support
- DVI, VGA and TV outputs

**Was $89.95 – Save $10**

DCSAPD14 **$79.95**

### Leadtek PX8400GS – 256MB



- Nvidia Chip-set
- Direct X 10 & Shader 3 support
- DVI and VGA outputs

**Was $99.95 – Save $10**

DCLEA165 **$89.95**

### Asus 8500GT – 512MB



- Nvidia Chip-set
- Direct X 10 & Shader 3 support
- DVI and VGA outputs

**$189.95 – Save $45**

DCLEA165Was **$144.95**

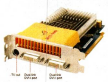
### Sapphire Radeon HD2600PRO – 256MB



- ATI Chip-set
- Hardware processed 1080p
- HDMI with 5.1channel sound

DCSAP016 **$149.95**

### Asus 8600GT – 256MB



- N-vidia Chip-set
- Ideal for games and workstation use
- No fan silent design

**Was $229.95 – Save $40**

DCASU029 **$189.95**

### Gigabyte 8600GT - 512MB



- N-vidia Chip-set
- Supports SLI and Pure Video technology
- No fan silent design

**Was $229.95 – Save $40**

DCGIG115 **$181.95**

### Asus 8800GTS - 320MB



- N-vidia Chip-set
- Two x DVI outputs support two 2560x1600 displays
- Supports SLI and Pure Video technology
- HDCP Compliant

DCASU036 **$489.95**

### Gigabyte 8800GT - 512MB



- N-vidia Chip-set
- Industry's best 512MB DDR3 memory
- Supports SLI and Pure Video technology
- No fan silent design

DCGIG117 **$489.00**

## Gigabyte INTEL (775) Mainboards

### GA-945GCMX-S2

- Ideal workstation or home use
- Supports 1333MHz FSB Intel chips
- Onboard gigabit LAN, Video and Sound



MBGIG280 **$89.95**

### GA-P31-S3G

- More PCI slots for expandability
- Supports up to 1333MHz FSB Intel chips
- Onboard gigabit LAN, Video and Sound



MBGIG302 **$124.95**

### GA-73PVM-S2H

- Ideal for media centre use
- Digital audio (Optical) output
- DVI VGA and HDMI video outputs
- Supports up to 1333MHz FSB Intel chips
- Onboard gigabit LAN and firewire interfaces



MBGIG301 **$139.95**

### GA-X38-DS4 (SLI)

- Designed for enthusiasts with extreme over-clocking and blistering gaming performance in mind
- Onboard Digital audio, Firewire and Gigabit LAN
- Supports up to 1600MHz FSB Intel chips
- Heat pipe cooling system



MBGIG303 **$284.95**

## Gigabyte AMD (AM2) Mainboards

### GA-M61SME-S2L

- Excellent for workstation or home use
- Supports AMD AM2 chips
- Onboard video, sound and LAN



MBGIG296 **$100.00**

### GA-770X-DS3

- 3x Firewire and 10x USB for connect-ability
- 4x RAM slots for future expansion
- Digital audio (Optical+Co-Axial) output
- Supports AMD AM2 chips



MBGIG298 **$159.95**

### GA-M69GM-S2H

- Excellent for Media Centre systems
- Onboard DVI VGA and HDMI outputs
- Digital audio (Optical) output
- Supports AMD AM2 chips



MBGIG293 **$129.95**

### GA-790X-DS4 (SLI)

- High performance platform with support for the new AMD Phenom quad-core processors
- Digital audio (Optical+Co-Axial) output
- Supports AMD AM2 chips



MBGIG299 **$234.95**

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# Adelong Computers

## CB Radio Twin Pack



- Up to 5 km range
- Backlit LCD Display
- Channel Scan & Call Alert
- Key Lock function
- External Mic/Ear Jack Output
- VOX (Voice Activated)
- 4pk rechargeable batteries to suit PSDXG005 **$4** (two required)
- Dual Charger to suit PSDXG071 **$9.90**

CMHSFG002 **$32.95pr**

## Rechargeable Batteries

4pk AAA 700mAH
PSDXG006 **$6.90**

4pk AA 2300mAH
PSDXG005 **$9.90**



## 3 Watt CB Radio

- Up to 10 kilometer range
- 38 channels and 38 sub-code function:
- Scrambler function
- Dual watch/VOX function
- Selectable 0.5W/3W output power
- Repeater function
- Detachable antenna, 9.5 cm
- Includes charger and batteries

Extra 4pk rechargeable batteries to suit
PSDXG005 **$9.90**

Extension Microphone to suit
CMDXG999 **$19.95**



CMDXG007 **$139.00ea**

## Battery Charger

For charging 2 or 4 pcs of AAA or AA Ni-Cd/Ni-MH batteries
Slim pocket size designed for traveling
Prevents overcharging of batteries
Discharge function
Includes power adaptor



PSDXG063 **$18.90**

## Audio Video Sender + Receiver with Infra Red Extender

This Audio Video system allows your to share your music and picture information all over your home. Perfect for use with cable TV boxes, DVD players and surveillance. Connections are via RCA jacks and all cables are supplied.
Built in IR extender allows you change channels without changing rooms.
Additional receivers are available, allowing you to broadcast to more rooms than one!



**Sender + Receiver**
TVELE000 **$62.95**

**Extra Receiver**
TVELE001 **$44.90**

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**Adelong Computers**
129 York Street
Sydney NSW 2000
Phone : (02) 9260 3188
Fax : (02) 9267 5042
**Email : sales@adelong.com.au**
**Website : www.adelong.com.au**


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We are here




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IF PAYING BY CHEQUE PLEASE INLUDE YOUR DRIVERS LICENCE DETAILS DIRECT DEPOSIT: COMMONWEALTH BANK, CNR GEORGE & MARKET ST SYDN EY 2000, BSB: 062 005, ACCOUNT NO: 1045 4228

Name/Company: Tel: ( ) Fax: ( )

Delivery Address: Postcode:

| Code: | Description | Qty: | Price: |
|---|---|---|---|
| | | | $ |
| | | | $ |
| | | | $ |
| | | | $ |

Card No: ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ Expiry: ☐☐/☐☐

Cardholder Name:

Signature:

Amex ☐ 3% Surcharge: $
Diners ☐ 4% Surcharge: $
Cheque ☐ Mastercard ☐ Bankcard ☐ Visa ☐ Total: $

Billing Address:

We are unable to deliver to PO Box for insurance reasons.
Please specify your billing address. *All deliveries include insurance.


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ORDERING & PAYMENT: We accept payment by Bankcard, Mastercard, Visa, Amex and Eftpos. All company/personal cheques and direct deposits are subject to seven working days clearance. Goods ordered by fax or post will be charged at the current price on the day of receipt. Orders can be made by phone, fax, by visiting one of our showrooms or via our web site. Deposits are non refundable.
CREDIT ACCOUNTS: Accounts may be opened for Govt, Depts, Education and selected incorporated businesses, subject to status. Credit account orders are only accepted on official stationary by fax or post. We reserve the right to withdraw credit facilities.
WARRANTY AND RETURNS: All computer systems come with a seven day customer satisfaction guarantee, of which shipping charges to and from the customer are not refundable. Orders are refundable, subject to final inspection of goods by Adelong Computers. Products will only be accepted back in original condition. Adelong will not accept any courier charges for return goods. Carriage for warranty repairs must be paid for by the customer. A returns authorisation number (RA#) must be obtained before the return of any product. A returns number is valid for 14 days only. Failure to display the RA number will result in the return being refused.
All computer warranties are supplied as coverage for hardware only. In the event that faults are found to be a result of software failure, a service fee will be charged. We reserve the right to stipulate that our warranty is only on PC's and Parts overrides all other warranties that might be stated by the manufacturers.


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